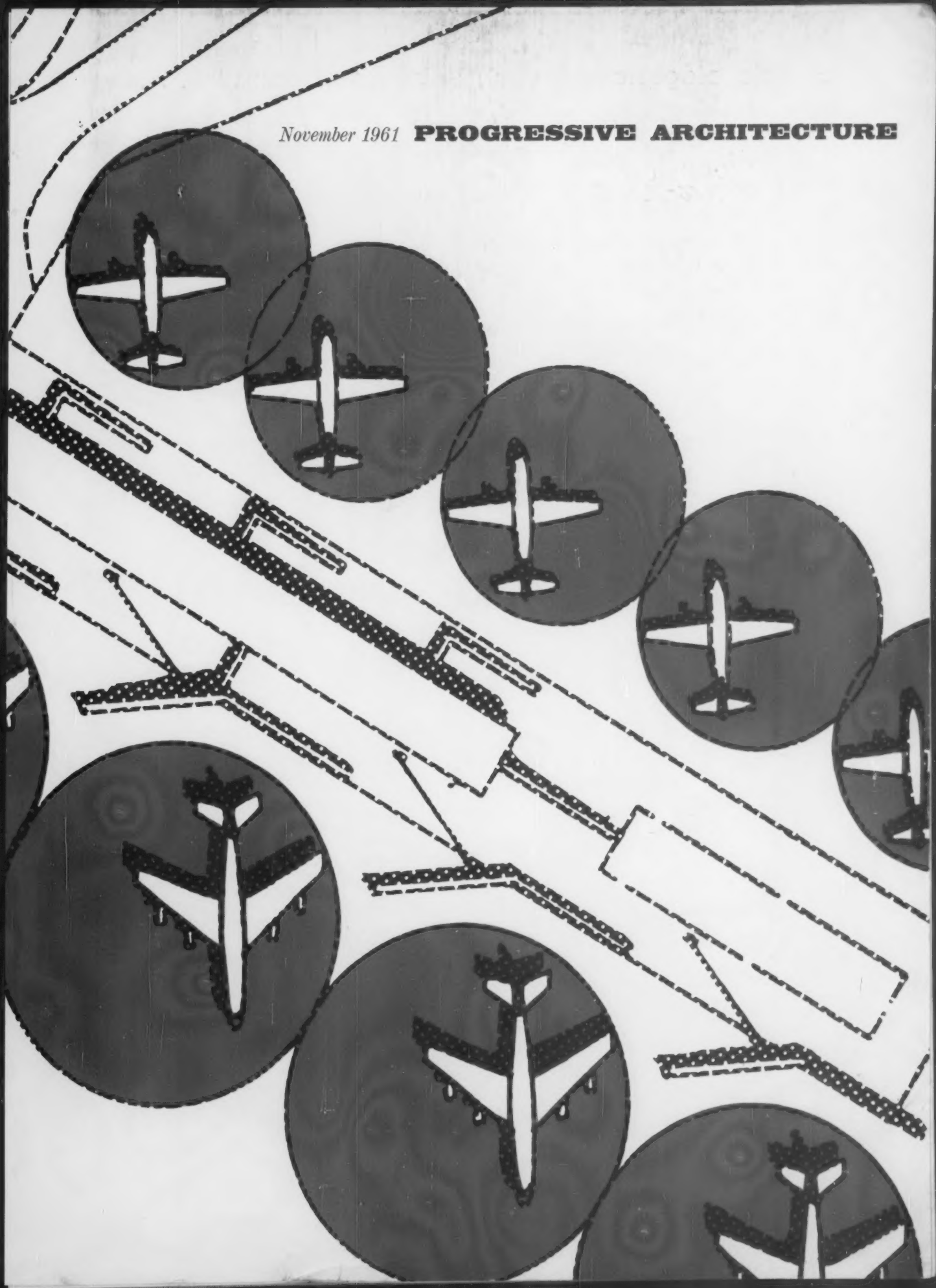
November 1961 **PROGRESSIVE ARCHITECTURE**



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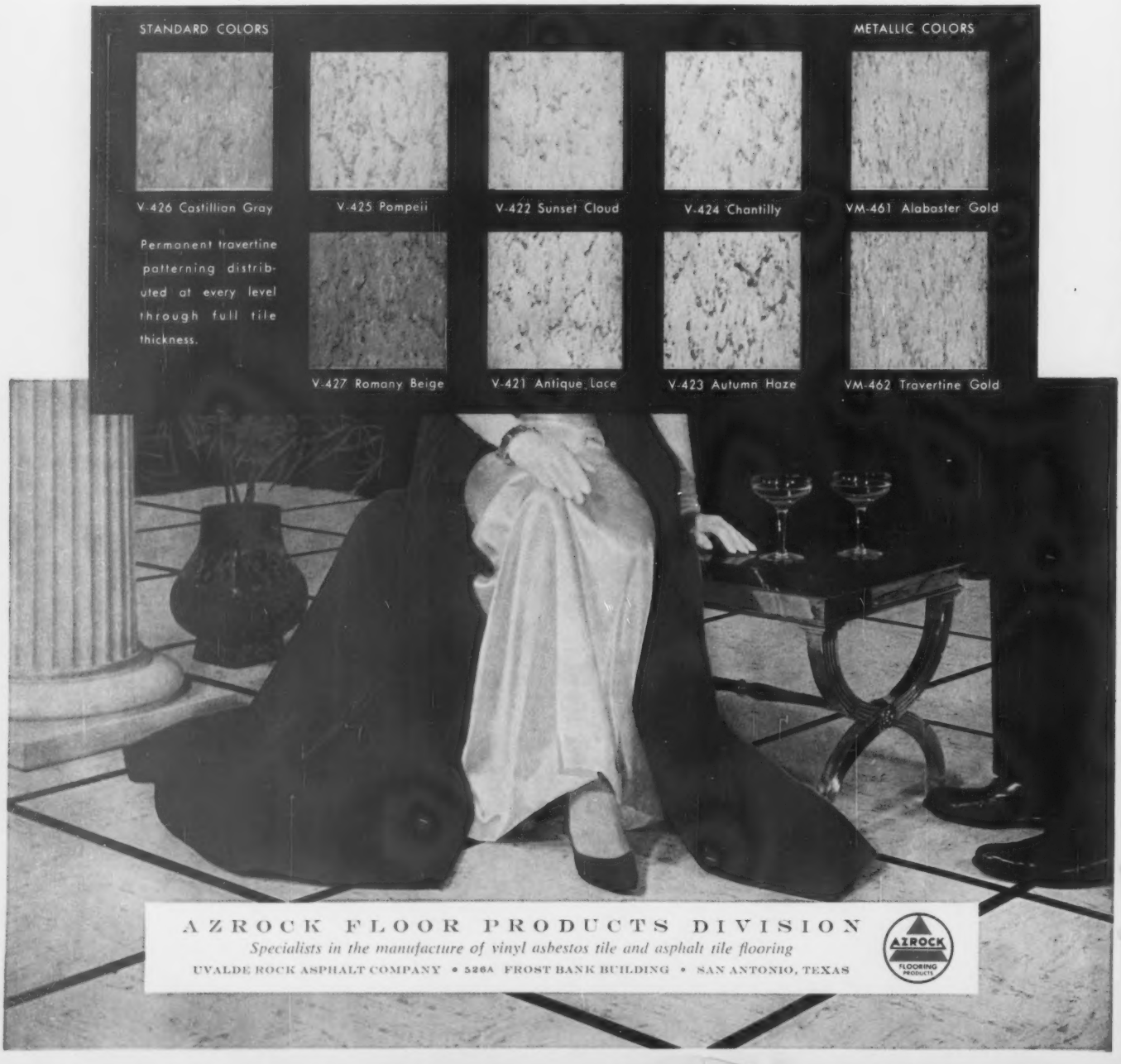

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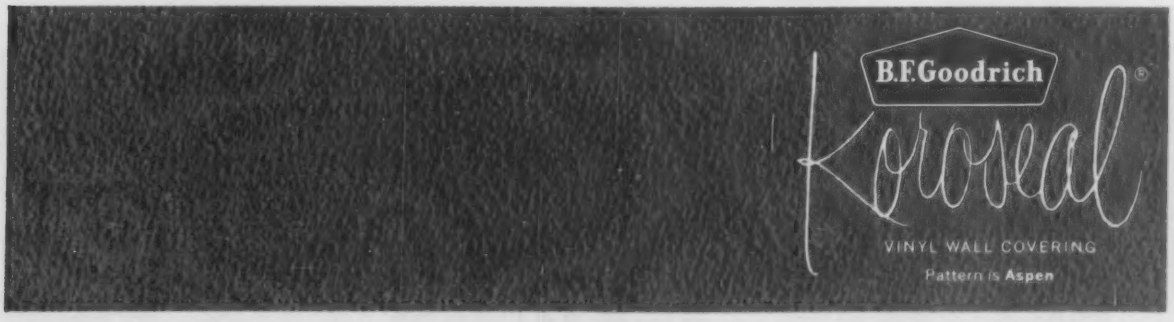

PELLA PRODUCTS . . .

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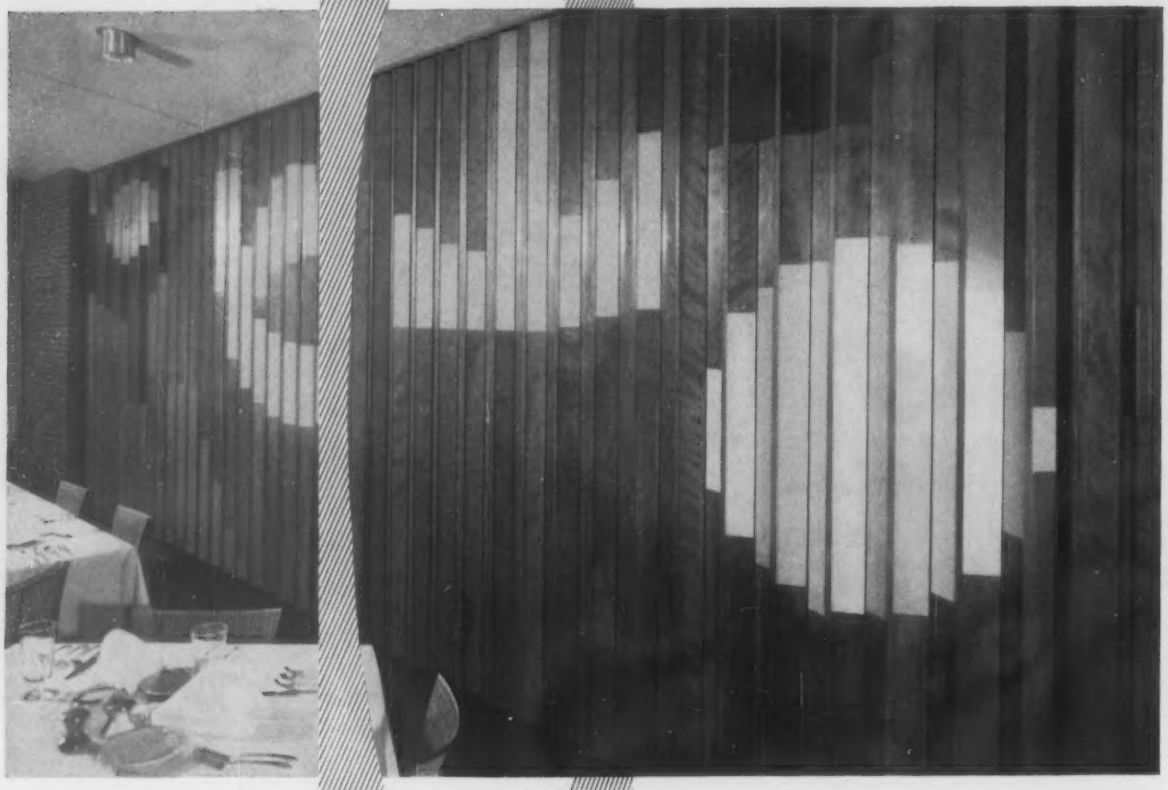

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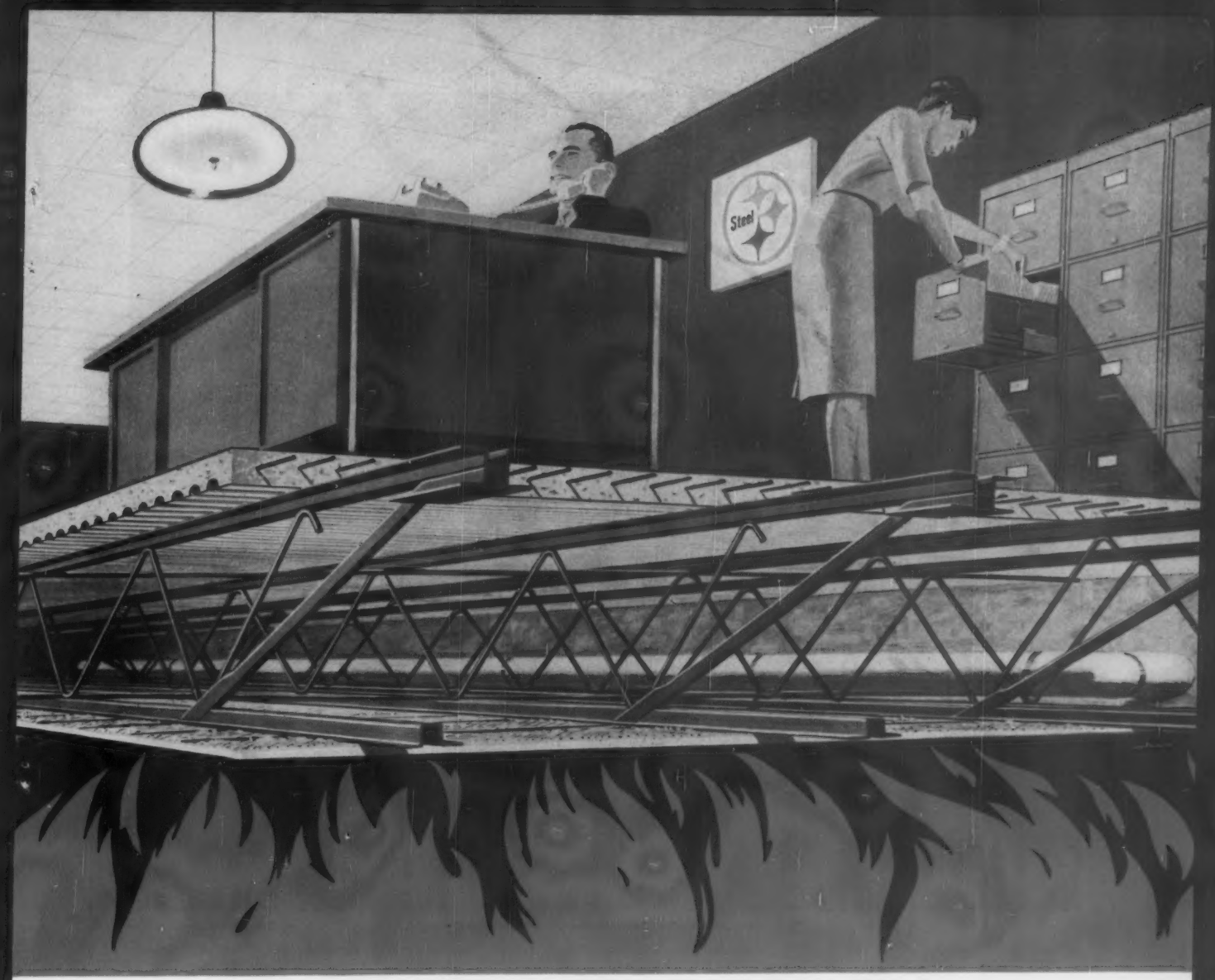

This floor-ceiling construction resists fire for 3 hours or more

Whenever fire-resistance is a primary requirement . . . the Bethlehem Open-Web Steel Joist construction shown above is hard to beat. It provides fire protection of 3 hours or more, as required for Class A fireproof structures such as stores, schools, hospitals, and apartments.

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Steel *for Strength . . . Economy . . . Versatility*

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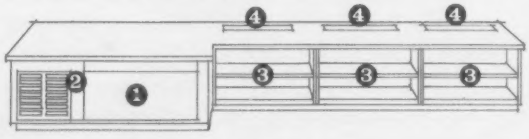
Nationally honored by the American Association of School Administrators, the Northside Elementary School Addition in Morrilton, Arkansas is also an example of the way Norman Systems permit flexibility in design and economy in construction.

Every classroom in this all-modern addition has its own gas-fired warm air Norman System to assure room-wide comfort and a healthful pupil environment for maximum study and learning. No revamping of the existing heating method was needed. No tunnels, trenches of interconnecting network of ducts or pipes. The construction savings are obvious.

Norman automatically mixes fresh outside air with recirculated room air and uniformly distributes this conditioned air during occupied periods. Automatically conserves fuel nights and weekends. The operation and maintenance economies have been proved year after year in thousands of classrooms where Norman Schoolroom Heating and Ventilating Systems are already installed.

For facts and figures, send for comprehensive Manual on Norman HVS Horizontal or Inn-A-Wal Counter Flow models.



NORMAN HVS Model illustrating
1. Furnace Enclosure. 2. Return Air Grille. 3. Util-i-Duct® Bookshelf. 4. Air Diffuser. Also available in Inn-A-Wal Counter Flo Model for use in separate heater room.

Norman® PRODUCTS COMPANY

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For more information, turn to Reader Service card, circle No. 372

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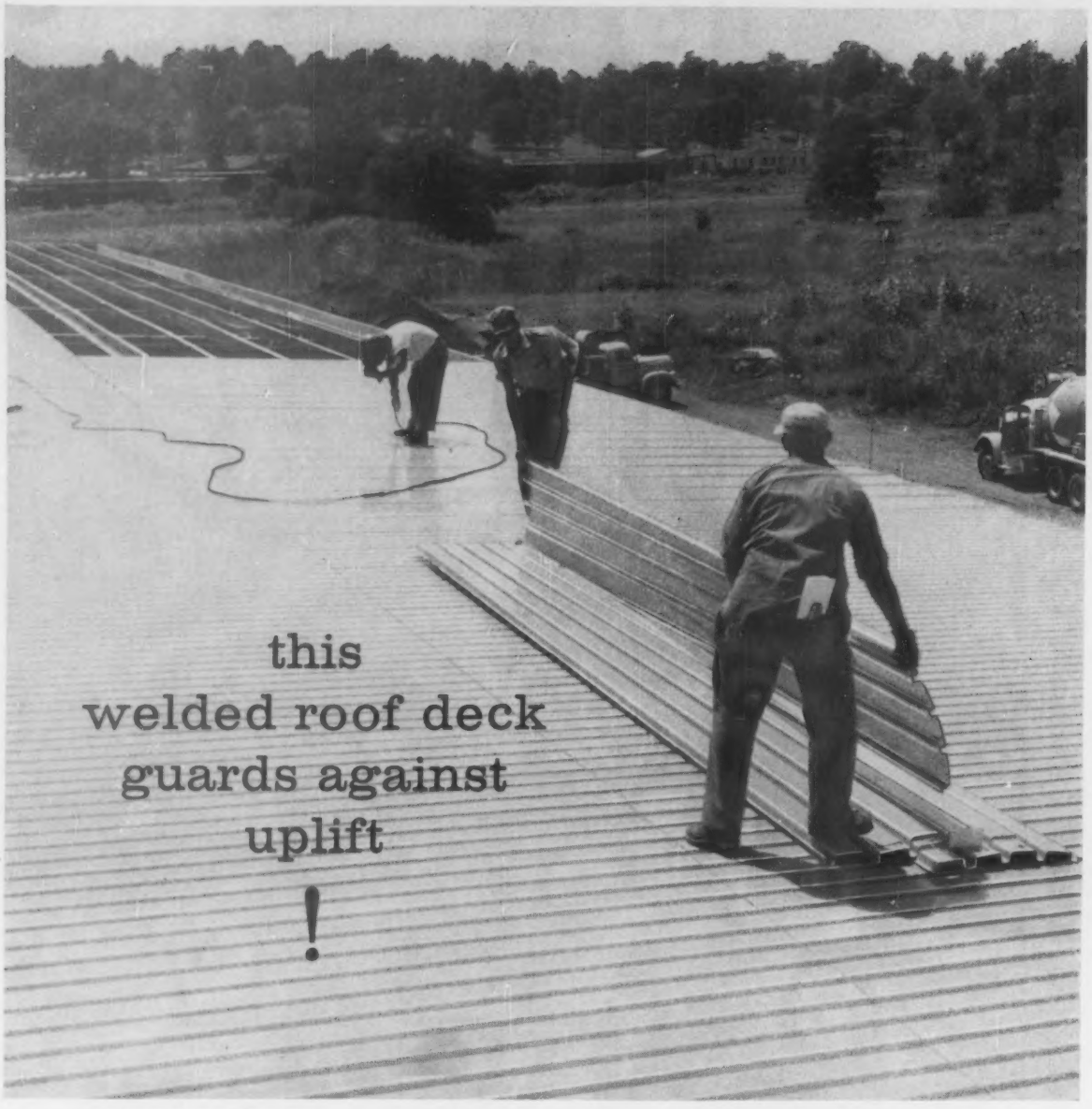

STEEL makes the difference

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Steel roof deck has the inherent strength of steel. And it is also anchored by welding to the supporting framework.

Welding patterns provide a gross wind uplift resistance of 45 pounds per square foot for eave overhang; 30 pounds per square foot for all other roof areas.

The uplift resistance is sufficient to withstand hurricane forces. This has been proven on actual jobs in coastal regions.

Steel deck provides a lateral diaphragm that distributes the horizontal forces of wind and seismic thrust. It also provides lateral restraint to top chords of supporting steel structural members.

Resisting uplift and lateral loads is just one advantage of steel roof deck. Others are detailed in specific product catalogs available upon request to any member company of the Metal Roof Deck Technical Institute.

METAL ROOF DECK TECHNICAL INSTITUTE

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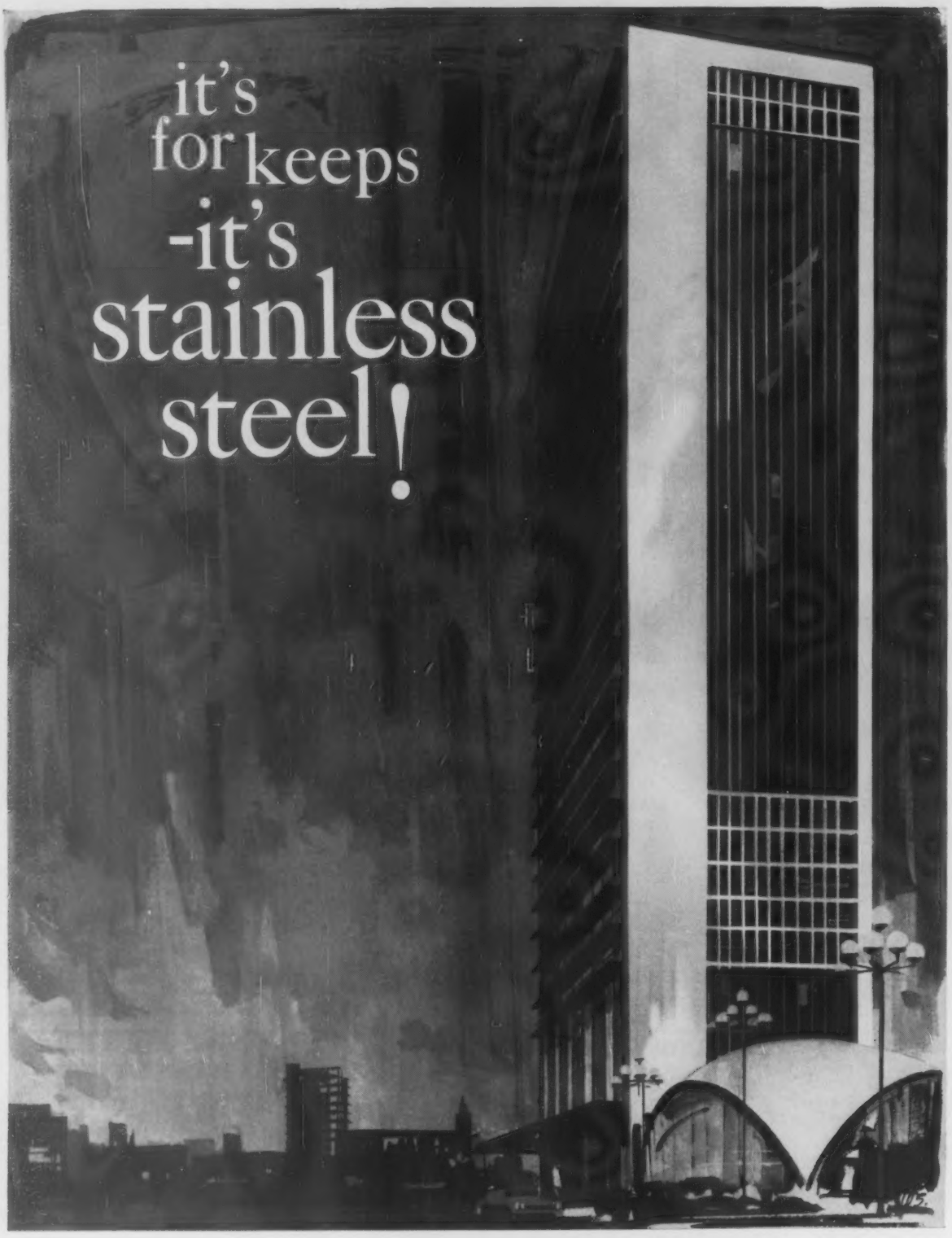

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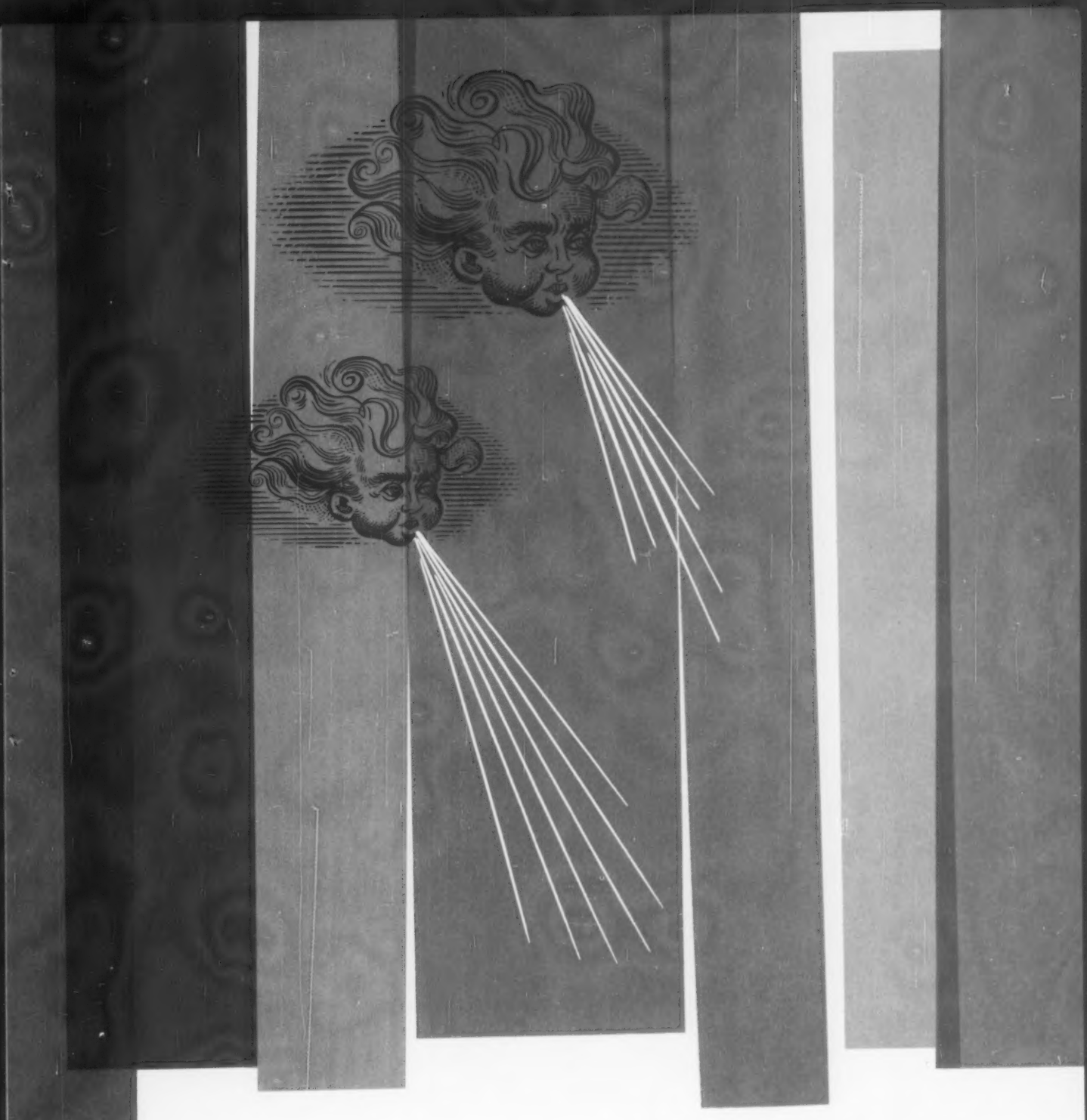


A special report on

ARMSTRONG VENTILATING CEILINGS

A remarkable new plenum-engineered ventilating system

ARMSTRONG VENTILATING CEILINGS

their advantages

1. A completely proven ceiling ventilating system

This new air-diffusion system is essentially an air-inlet system, employing a ceiling with thousands of perforations through which conditioned air is pushed from the plenum. Armstrong Ventilating Ceilings have been thoroughly lab- and job-tested. The engineering bases for this new kind of ventilating system have been fully developed for virtually all types of structures. Ventilating Ceilings have been used by a number of architects in a variety of different jobs. One of them—the Battle Creek Country Club—is shown at right. Some other recent jobs are listed on the last page of this report.

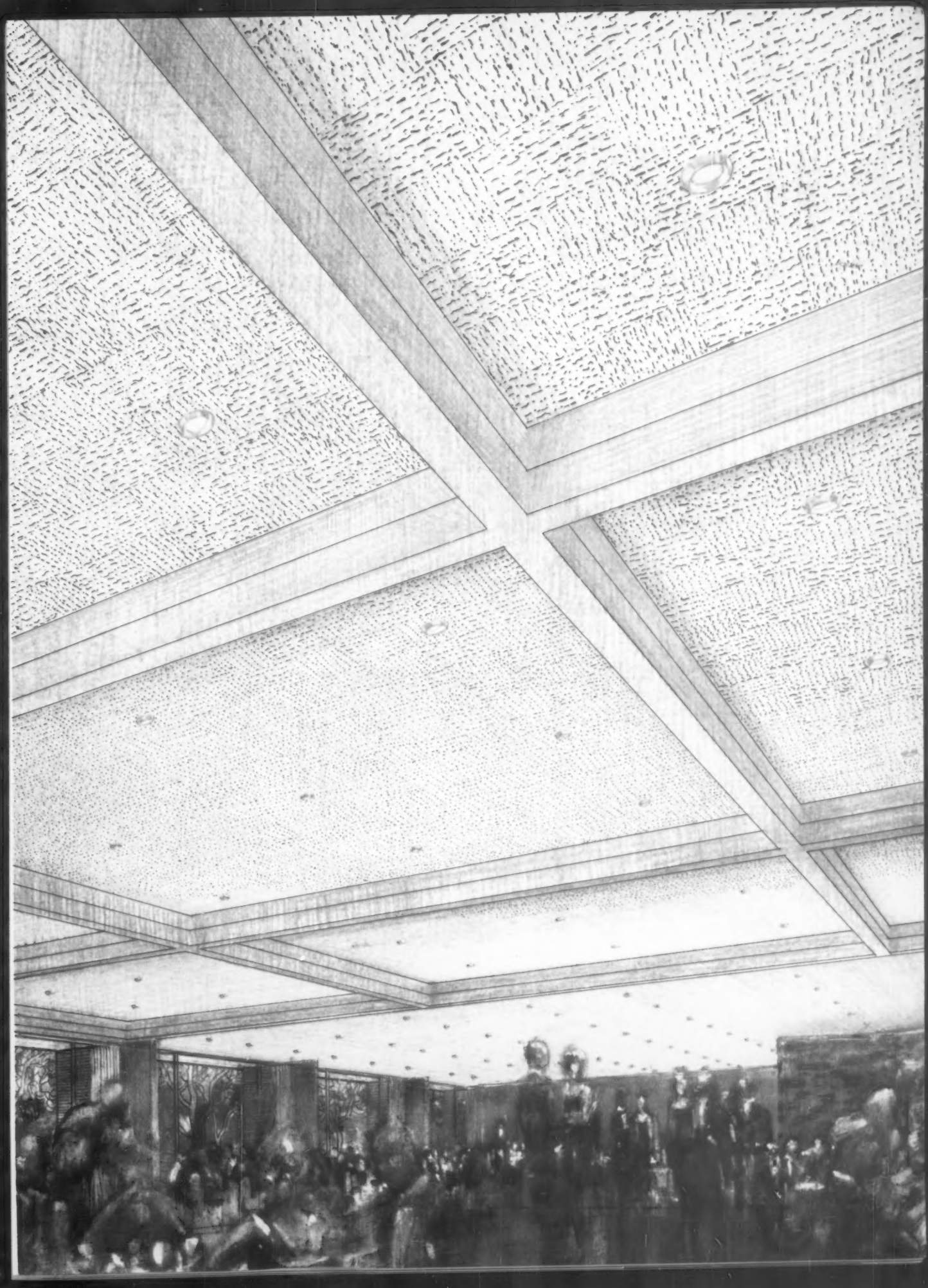
2. Shaves construction costs, cuts ductwork, eliminates diffusers

An Armstrong Ventilating Ceiling performs three essential functions: air diffusion, sound absorption, decoration. And when you use Armstrong Fire Guard in a Ventilating Ceiling, you can add a fourth function: time-design-rated fire protection. Since the plenum chamber acts as the room duct in an Armstrong Ventilating Ceiling, and since one duct stub is sufficient for most plenum chambers, much of the supply ductwork is eliminated. So are the diffusers, because the ceiling itself serves as the diffuser. In both new construction and remodeling, these two things alone offer appreciable cost savings. An Armstrong Ventilating Ceiling often permits the use of a shallower plenum than the conventional air-inlet system. This, too, saves money, by enabling you to have the required number of floors with less total building height.

3. Provides a handsome acoustical ceiling

Because an Armstrong Ventilating Ceiling eliminates the need for diffusers—or other noticeable air openings—it provides new opportunities for creative effects. In the Battle Creek Country Club, shown at right, the architects have created distinctive character with a giant-coffered ceiling, incorporating Ventilating Tile. In each tile, the tiny ventilating perforations account for two per cent of the surface. And they're virtually invisible, because they're part of the over-all pattern. Ventilating Ceilings are available in a number of different designs, in both tile and lay-in units, so you can select the one that best meets your aesthetic needs.

Renderings by Ara Derderian



ARMSTRONG VENTILATING CEILINGS

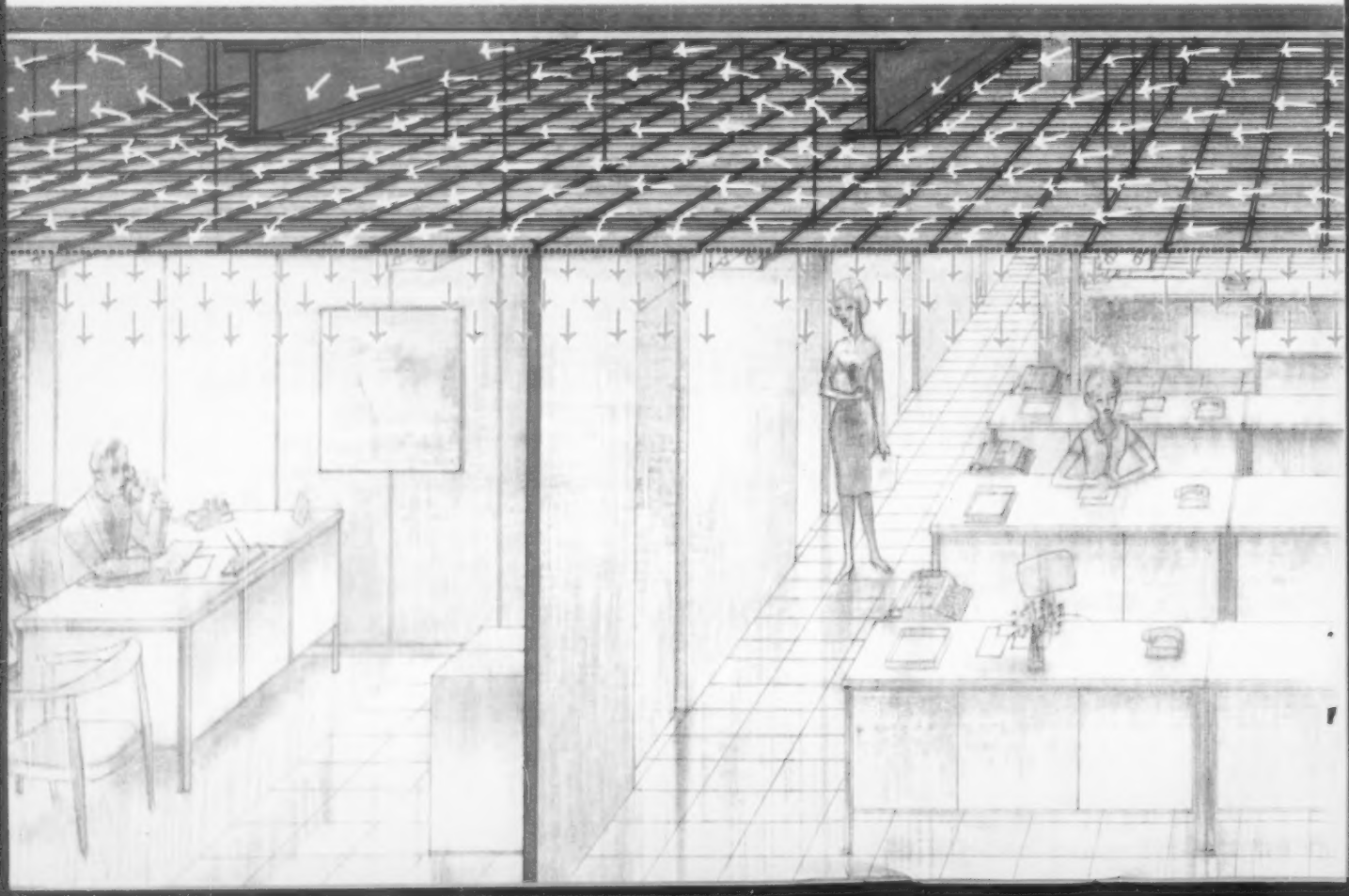
their functions

1. They air-condition—providing uniform air diffusion

Since the ceiling itself serves as a diffuser, an even flow of air is provided into and throughout the room. An Armstrong Ventilating Ceiling enables you to eliminate drafts and stagnant areas. Even in low-ceiling areas, draft problems can be eliminated. The picture below of a section of an office building shows how conditioned air is forced, under pressure, from the central unit through ducts to the duct stub supplying each plenum chamber. The result—comfort for all occupants.

2. They're self-cleaning—the down pressure provides a perpetual barrier against dirt and dust

Besides cooling or heating, the air forced through the perforations in an Armstrong Ventilating Ceiling repels dust and dirt, since there is a continuous flow of air flowing downward from the ceiling. The ceiling is, in effect, self-cleaning.

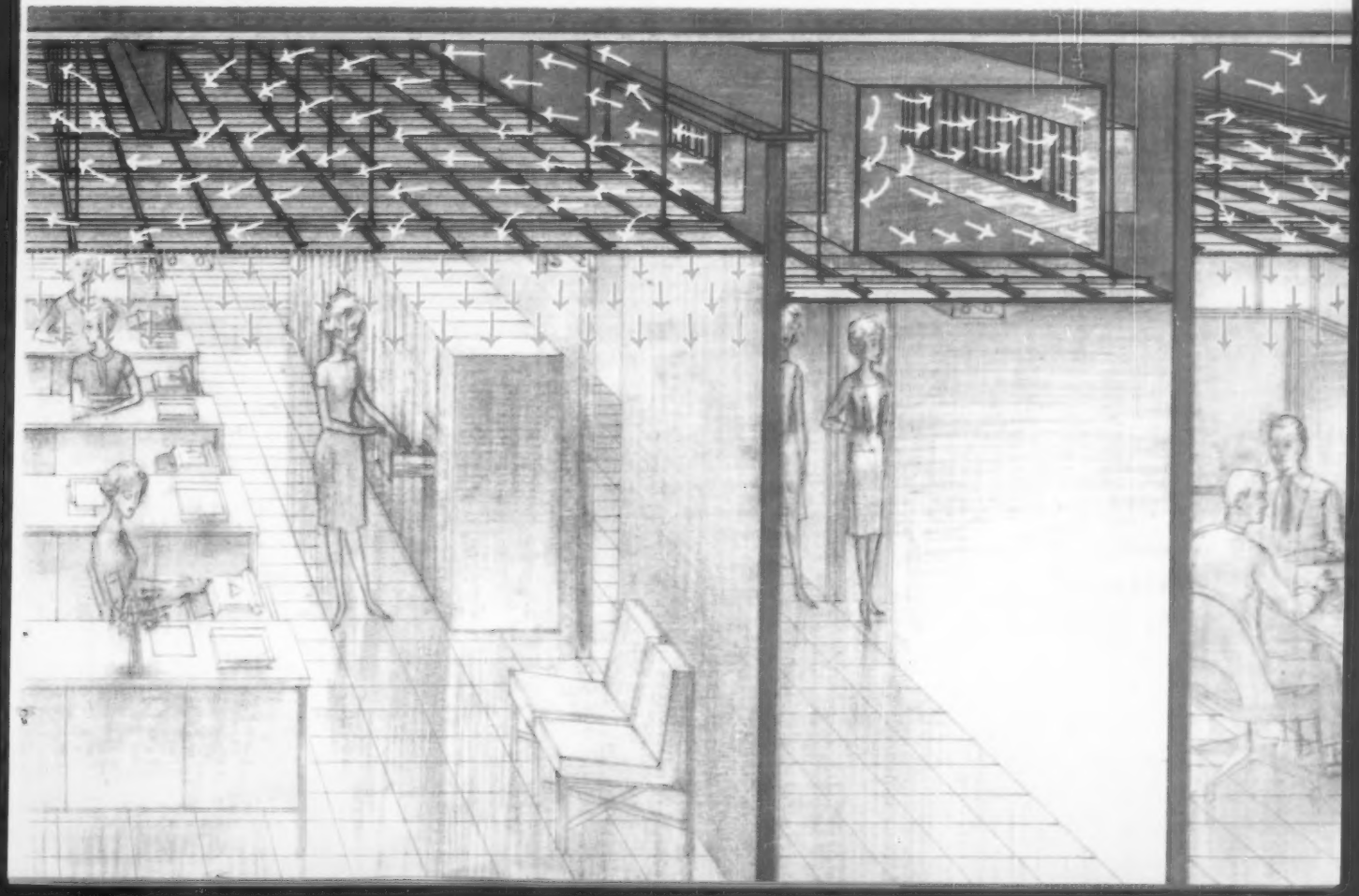


3. They're acoustical—hushing room noises, muffling air-conditioning sounds

Armstrong Ventilating Ceilings have the same high acoustical properties as other Armstrong Acoustical Materials. Noisy air diffusers are, of course, eliminated. And the suspended ceiling separates occupants from any noise that might be transmitted through air-conditioning supply ducts.

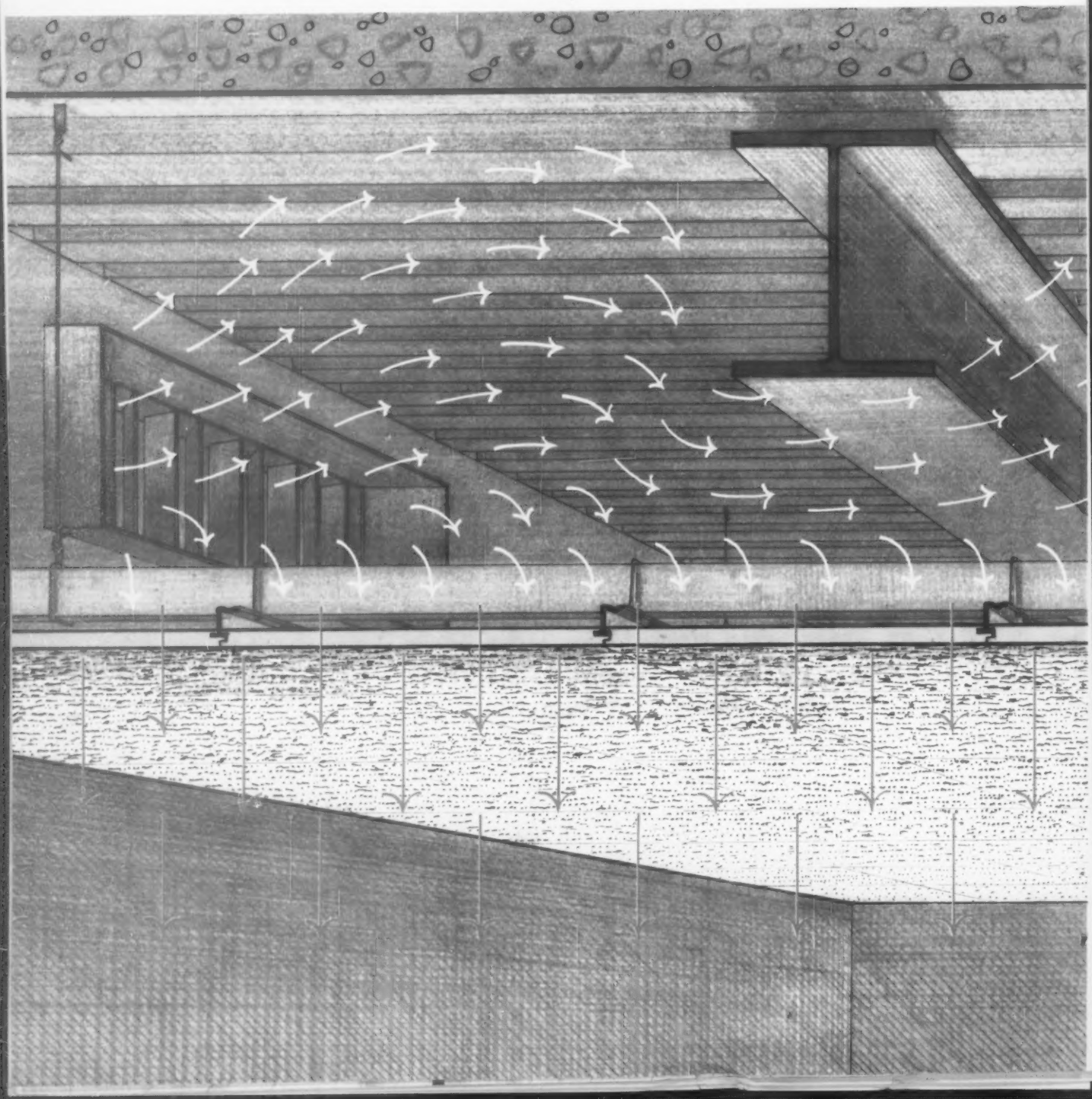
4. The ventilating ceiling can incorporate time-design-rated fire protection

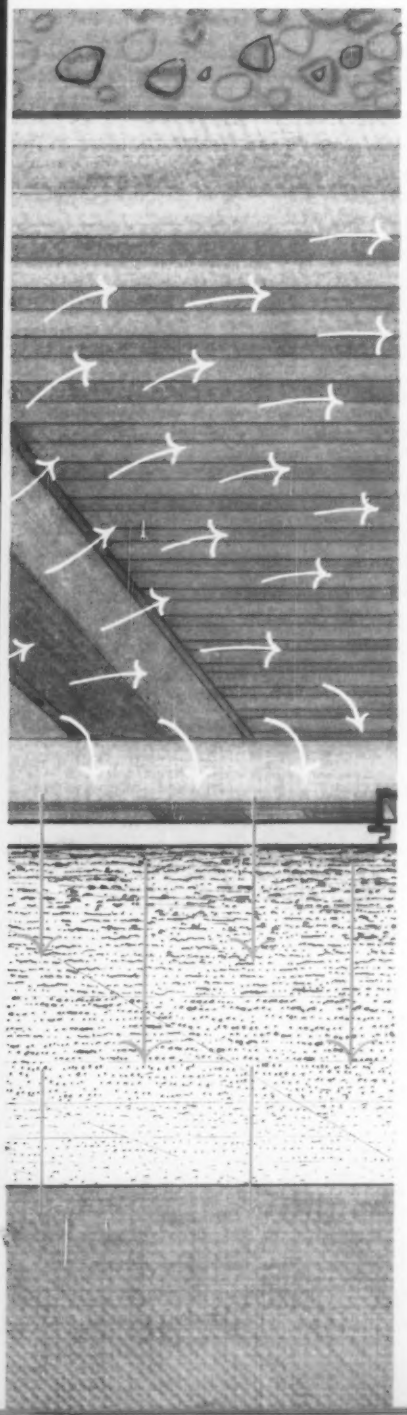
Armstrong Acoustical Fire Guard is available for use in Ventilating Ceilings. Floor-ceiling assemblies, using Ventilating Fire Guard throughout the ceiling, have been tested at Underwriters' Laboratories. The tiny ventilating perforations in the ceilings accounted for over-all open areas of two per cent. Beam-protection ratings up to four hours have been obtained for Ventilating Fire Guard Tile (UL Report 4177-6), and up to three hours for Ventilating Fire Guard Lay-In (UL Report R-4177-7).



ARMSTRONG VENTILATING CEILINGS

their technology





1. The plenum chamber acts as the duct... the ceiling acts as a diffuser

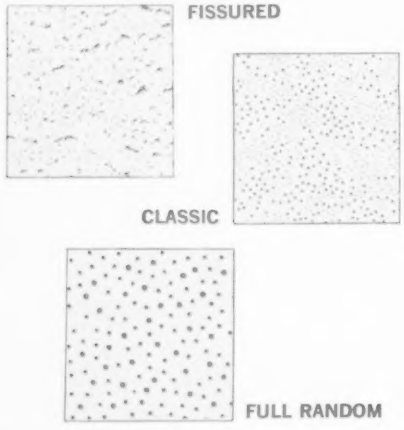
This system is remarkably simple in principle. As the sketch demonstrates, conditioned air enters the plenum chamber through the supply-duct stub by a low-pressure air-inlet system. It is dispersed throughout the chamber and is forced down through the ceiling into the room. Any conventional return-air system may be used with Armstrong Ventilating Ceilings. The system has proven very effective even in large plenum chambers. For example, in one installation, air was projected across 80′ in a 22″ plenum (despite the obstruction of 14″ I-beams) and achieved uniform distribution in the area below.

2. Special plenum-engineering data available

This data provides all the necessary factors and formulae for the correct design and engineering of plenum chambers where Armstrong Ventilating Ceilings are used as the air-inlet system. This step-by-step procedure has been specially developed for the use of ventilating engineers, and is available through your Armstrong Acoustical Contractor or Armstrong District Office.

DATA ON ARMSTRONG VENTILATING CEILING MATERIALS

For complete information on Armstrong Ventilating Ceilings, call your Armstrong Acoustical Contractor or one of the Armstrong Offices listed below. Or write to Armstrong, 4200 Miller St., Lancaster, Pa.



Travertone.
12"x12" fissured, mineral-wool tile, with square or beveled edges.

Minatone.
12"x12" mineral fiber tile in the Classic and Full Random designs, with beveled edges.

Minaboard Lay-In.
Nominal 24"x24" and 24"x48" units in the Full Random and Classic designs for exposed grids.

Fire Guard.
12"x12" fire-retardant tile in the fissured, Classic and Full Random designs with beveled edges.

Fire Guard Lay-In.
Nominal 24"x24" and 24"x48" units in the Classic design for Fire Guard grid.

Travertone, Minatone® and Minaboard® are trademarks of Armstrong Cork Company.

Some recent installations of Armstrong Ventilating Ceilings:

Battle Creek Country Club, Battle Creek, Mich.
architect: Haughey, Black and Williams, Battle Creek
mechanical engineer: Meckler Engineering Co., Toledo, Ohio
general contractor: Phelps-Wagner Builders, Battle Creek
acoustical contractor: B. C. Schuemann Co., Battle Creek

Dinwoodey Furniture Company, Salt Lake City
architect: Snedaker-Budd-Monroe & Associates, Salt Lake City
mechanical engineer and contractor: Richard C. Brown, Mayne Plumbing and Heating, Salt Lake City
general contractor: Cannon Construction Co., Inc., Salt Lake City
acoustical contractor: Utah Pioneer Corp., Salt Lake City

Northern Federal Savings and Loan Association, St. Paul, Minn.
architect and ventilating engineer: Associated Architects and Engineers, Inc., St. Paul
mechanical contractor: Pierre Aircon Co., St. Paul
general contractor: William Baumeister Construction Corp., St. Paul
acoustical contractor: St. Paul Linoleum and Carpet Co., St. Paul

Arizona Bank, Home Office Motor Bank, Phoenix
architect: Lester Byron, Phoenix
general contractor: Ray P. Petersen Contractor, Inc., Phoenix
acoustical contractor: Barrett-Homes Contractors, Phoenix

Armstrong General Office Building, Lancaster, Pa.
consulting engineer: Charles S. Leopold, Inc., Philadelphia
mechanical contractor: B&G Olsen Co., Inc., Richmond, Va.
acoustical contractor: Berger Acoustical Co., Inc., Haverford, Pa.

Lit Brothers Restaurant, Philadelphia
architect: O. L. Fallan, AIA, Philadelphia
chief designer: John Jones, Philadelphia
acoustical contractor: Berger Acoustical Co., Inc., Haverford, Pa.

John Deere Office Building, Moline, Ill.
architect: R. B. DeJeager, company architect, Moline, Ill.
ventilating engineer: Ward Jensen, company engineer, Moline
general contractor: Axel Carlson Company, Moline
acoustical contractor: Builders Sales & Service Co., Moline

4747 Building, Phoenix
architect: Ralph Haver & Asso., Phoenix
mechanical engineer: Lowry & Sorensen, Phoenix
general contractor: Gilbert & Dolan, Phoenix
acoustical contractor: Barrett-Homes Contractors, Phoenix

St. Paul's Church Home, Inc., St. Paul, Minn.
architect: Buetow and Associates, St. Paul
mechanical contractor: Healy Plumbing & Heating Co., St. Paul
general contractor: J. S. Sweitzer & Son, St. Paul
acoustical contractor: St. Paul Linoleum and Carpet Co., St. Paul

Armstrong offices

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727 West Peachtree St., N.E.
TRinity 5-7201

BOSTON, MASS.
200 First Avenue, New England Industrial Center, Needham Heights 94. HIllcrest 4-5700

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RAymond 3-9381

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NEW YORK, N. Y.
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The recent Stark Sculptured Tile Contest for Architects and Contractors resulted in hundreds of imaginative adaptations and uses for Sculptured Structural Glazed tile.

Several of the winning *entries are combined in this illustration. One is a unique overall wall pattern using Stark's "Classic" design tile along with regular units. Another award idea used the same "Classic" design, combined with brass inserts throughout a complete series of church "furniture."

This nationwide contest again pointed out the almost limitless design possibilities of the only structural unit that offers inherent strength, pattern, economy and a glazed finish for beauty and minimum maintenance.

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*Judging panel consisted of two registered Architects and a leading Contractor—Cleveland, Ohio. Names of judges and contest winners available on request.

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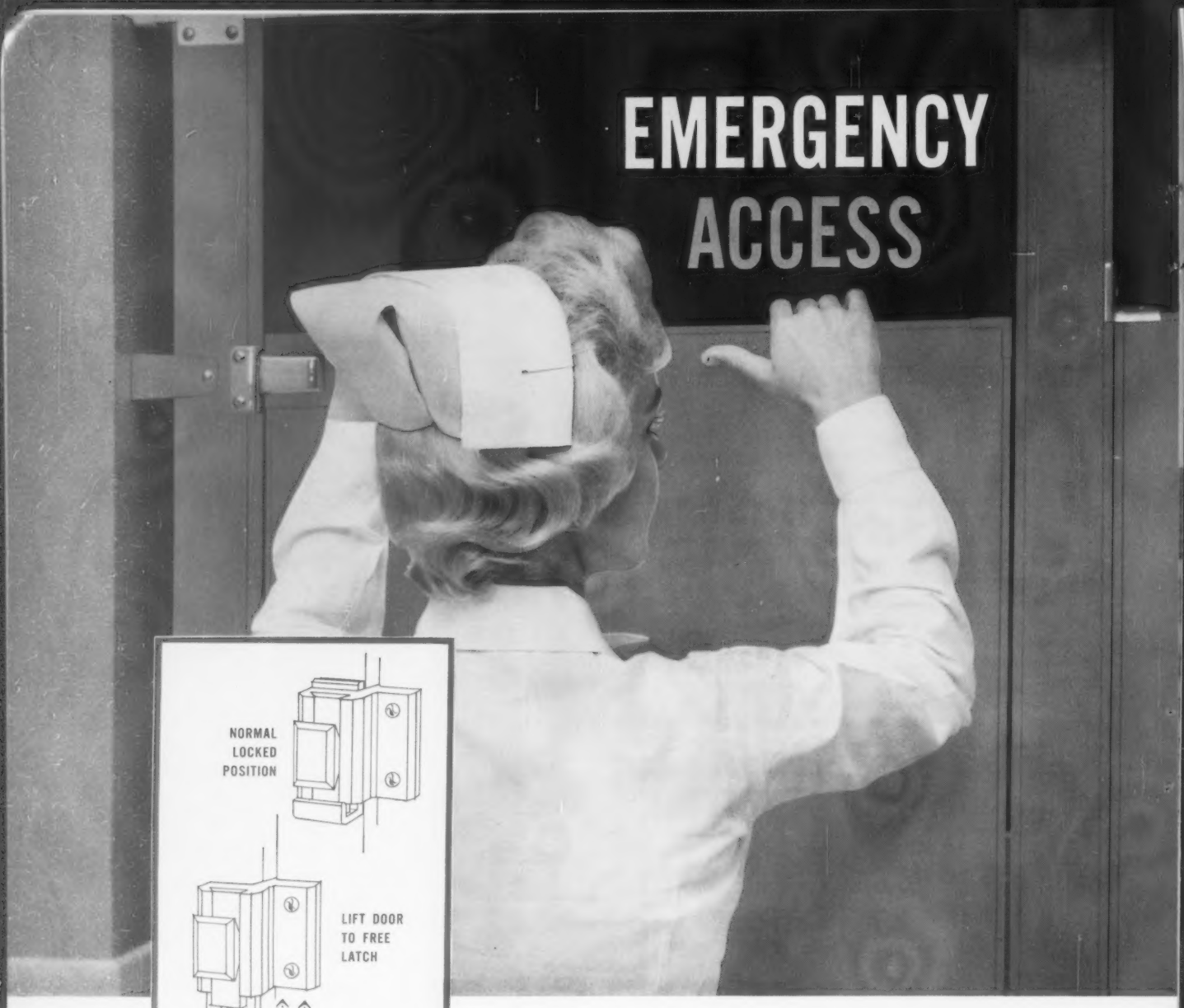

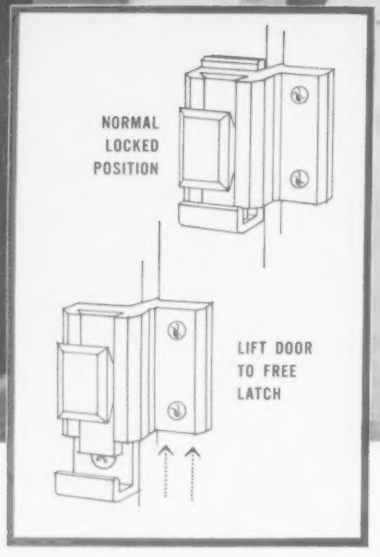

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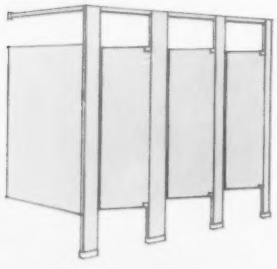

Weis Lift-Free Latch unlocks by merely lifting door upward

Lift the door... the latch is free... the door unlocked. No delay in reaching an emergency situation—*fast!* This exclusive Weis feature is especially important in hospital, nursing home, school and other institutional locations. It's a handsome, simple, cleanly designed latch, described in the new Weis Toilet Compartment catalog—write for copy.

SPECIFY **WEIS**

Prefabricated, Prefinished Products for the Building Industry

Toilet Compartments
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HENRY WEIS MFG. CO., ELKHART, INDIANA

Weis belongs where toilet compartments really take a beating

ADVAN guard®

AUTOMATIC RE-SETTING THERMOSTAT

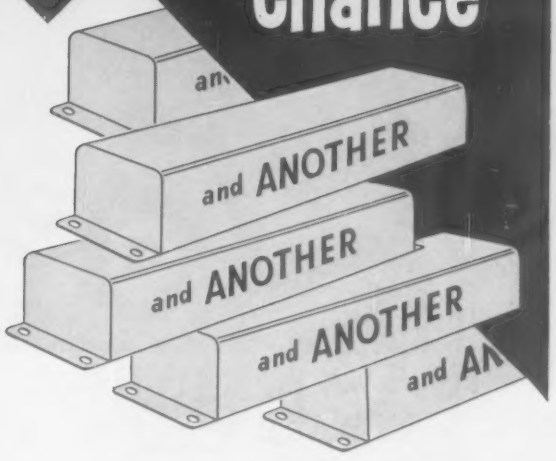
gives fluorescent lamp ballasts ..... a 2nd chance

prevents

PREMATURE DESTRUCTION

from:

- **Abnormal Operating Temperatures**
- **Incorrect Voltage Supply**
- **Excessive Current**
- **Internal Short Circuiting**
- **Inadequate Lamp Maintenance**
- **Lamp Rectification**
- **Improper Fixture Application**



Protects against end-of-life hazards
. . . eliminates the need for individual fusing.

Only ADVAN-guard®, a thermally actuated protective thermostat sealed in the ballast housing, gives fluorescent lamp ballasts a "Second Chance." It automatically "trips-out" whenever the ballast operates at abnormal temperatures from any internal or external cause. Unlike other protective devices which permit premature ballast destruction by cutting the ballast out of the line only after it has been destroyed, ADVAN-guard® cuts out before heat can cause premature destruction, resets automatically when the trouble has been corrected and permits the ballast to resume normal operation. Insist on ADVAN-guard® equipped fluorescent lamp ballasts for safety and longer life.

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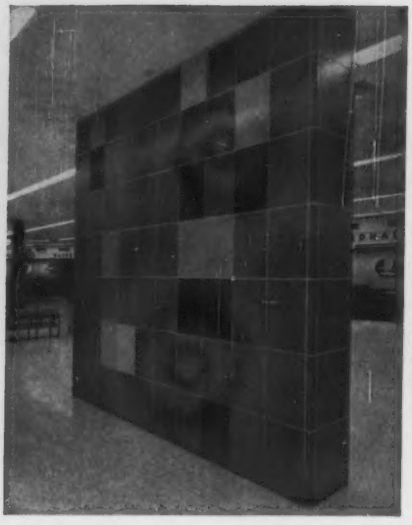

MIAMI INTERNATIONAL AIRPORT, Miami, Fla.

Architects—*Steward and Skinner.* **Builders**—*Gust K. Newberg Construction Co., and Fred Howland, Inc. Ceramic Veneer, 16" x 22" x 1¼" in various colors including green, light and dark gray, maroon and blue, was specified for interior of new airport addition, as well as the entire exterior facing under canopy at all airline embarkation areas.*

What's your airport design problem?

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FEDERAL SEABOARD TERRA COTTA CORPORATION

F S T C

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New

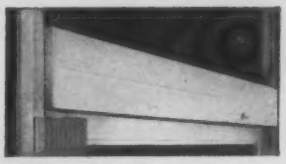
STANLEY MAGIC-DOOR®

Electric

AUTOMATIC DOOR OPERATING EQUIPMENT

is economically practical for almost every type of commercial application.

This compact Electric Operator is realistically priced and easy to install. Like all STANLEY MAGIC-DOOR operators, it is ruggedly constructed and amply powered to insure years of dependable service in stores, banks, office buildings, institutions and similar establishments.



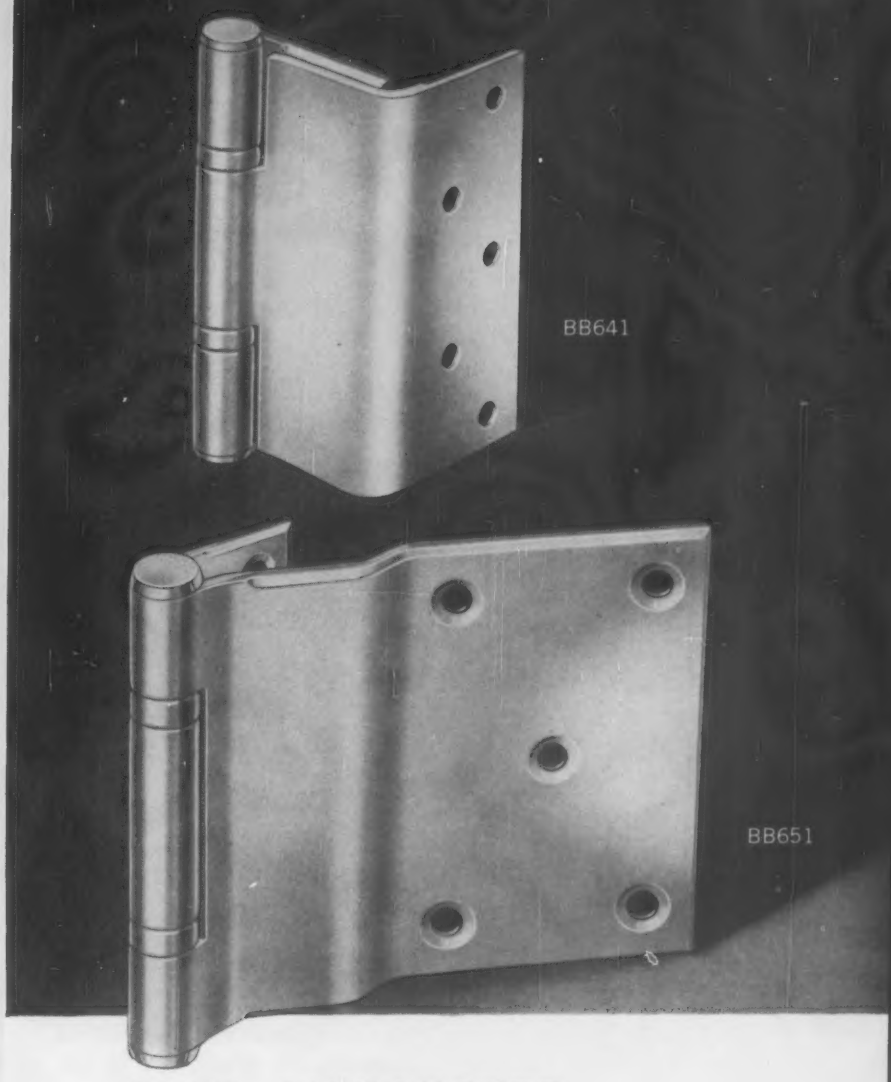
MODEL EH-1 FOR IN-THE-HEADER MOUNTING

Two models—for in-the-header mounting (EH-1) or visible mounting (EV-1)—are applicable to new or existing doors 30" to 42" wide. Unit provides manual release in event of power failure and is designed for economical maintenance.

3 TYPES OF OPERATORS

Stanley's **Hydraulic, Pneumatic** and new **Electric** MAGIC-DOOR Operators make up a complete line of automatic door operating equipment that provides you with the right selections for all kinds of commercial, institutional and industrial operating conditions.

See your Stanley MAGIC-DOOR Distributor for technical details or write to Stanley Hardware, Division of The Stanley Works, MAGIC-DOOR SALES, Dept. K, 78 Lake Street, New Britain, Connecticut.



SLIM SILHOUETTE...

and "SWING-CLEAR" STYLING

The modern, trim BB600 Series 3-Knuckle Ball Bearing Hinge* recently introduced by STANLEY is now also available in "Swing-Clear" Styling.

Where the attractive, trim look is desired throughout modern hospitals and institutions, you can now specify matching standard and "Swing-Clear" type template hinges with the new BB600 Series slim silhouette styling. Specify BB641 for half mortise and BB651 for full surface "Swing-Clear" Hinges with the trim, modern look.

Write for your copy of our Hospital Hardware Folder (H-157) to: Stanley Hardware, Division of The Stanley Works, Dept. K, 78 Lake Street, New Britain, Conn.

*Patents Pending

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AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • power tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany.

CANADIAN PLANTS: HAMILTON, ONTARIO AND ROXTON POND, P.Q.

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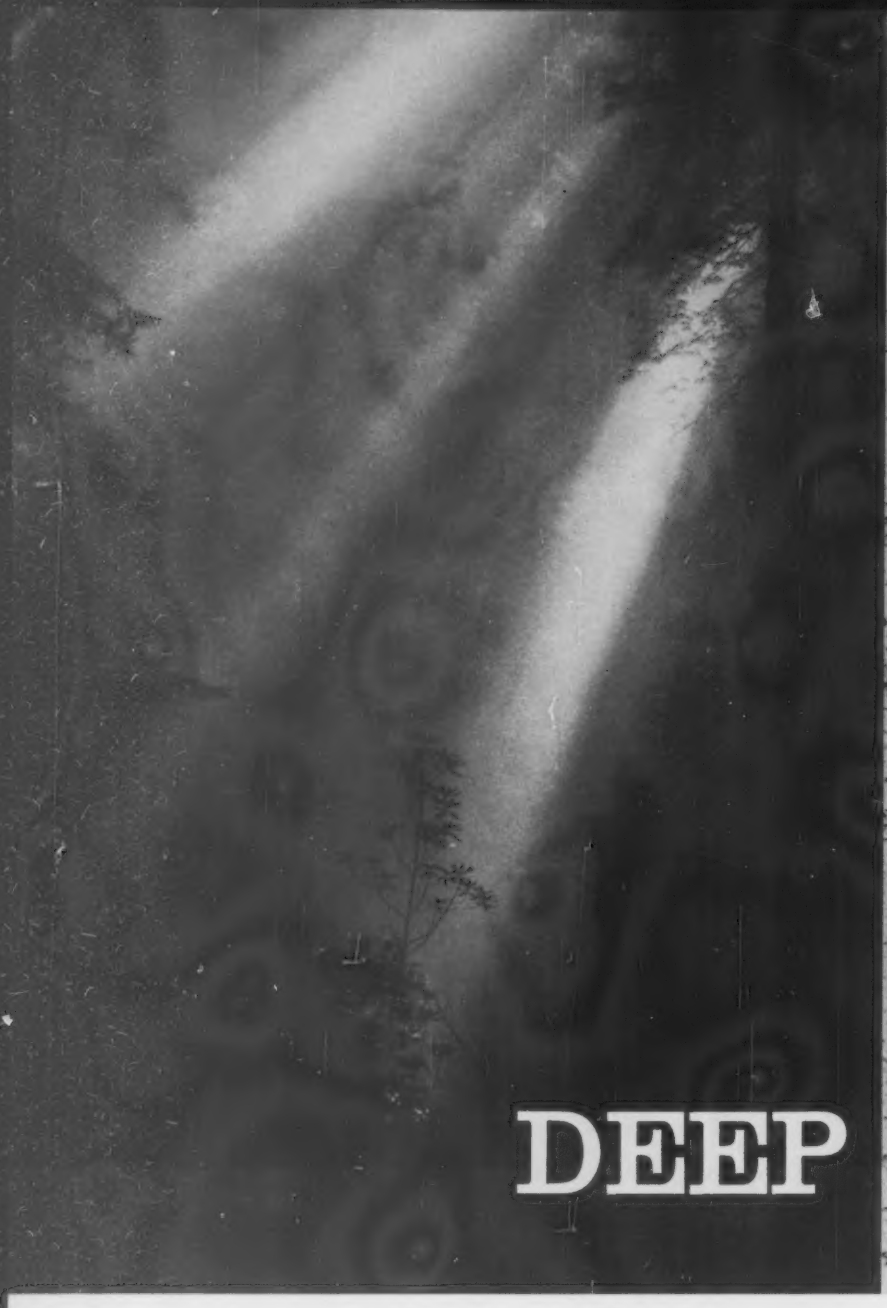

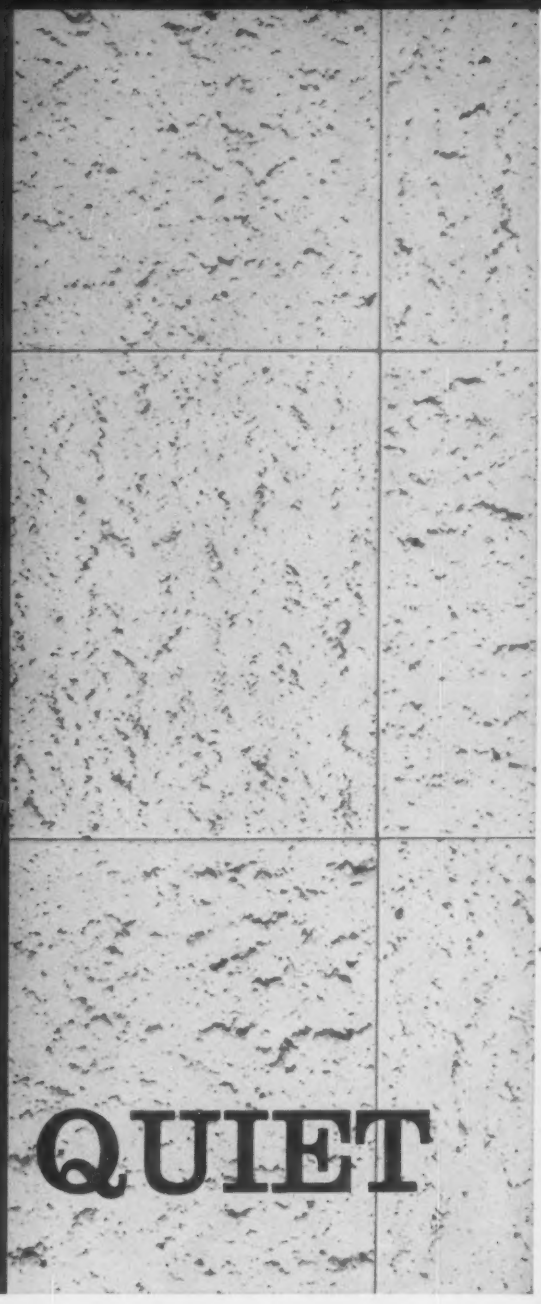

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WITH
B-E-H STYLTONE®
ACOUSTICAL TILE

Styltone absorbs sound. It delivers a noise reduction coefficient of .80, cuts clamor to quiet, lowers noise levels to a minimum, makes any interior better to work in, pleasanter to be in. Manufactured from non-combustible mineral wool, Styltone resists rot and decay. It won't sustain the life of fungus, rodents or insects. It's built for a lifetime of maintenance-free service – and with all this, a new, advanced B-E-H manufacturing process adds looks to Styltone. Slight variations in the fissure size and design produce the effect of veined marble, perfectly attuned to all interior design. Available with squared or beveled edge, ¾" thick in precision sizes, 12"x12", 12"x23¾", 12"x24".

Write, wire or phone for complete information and the name and address of your nearest B-E-H acoustical contractor... the best man for the best job in your area. Baldwin-Ehret-Hill, Inc., Room 401, 500 Breunig Avenue, Trenton, New Jersey.

BEH BALDWIN EHRET HILL **BALDWIN-EHRET-HILL, Inc.**

Supplying a complete quality line of mineral, wood fibre and metal pan acoustical products for every requirement.

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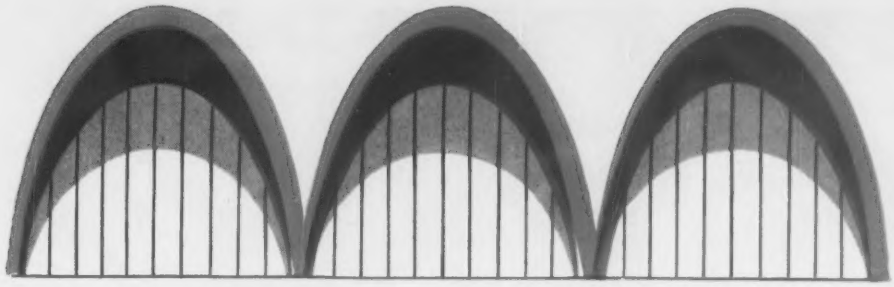
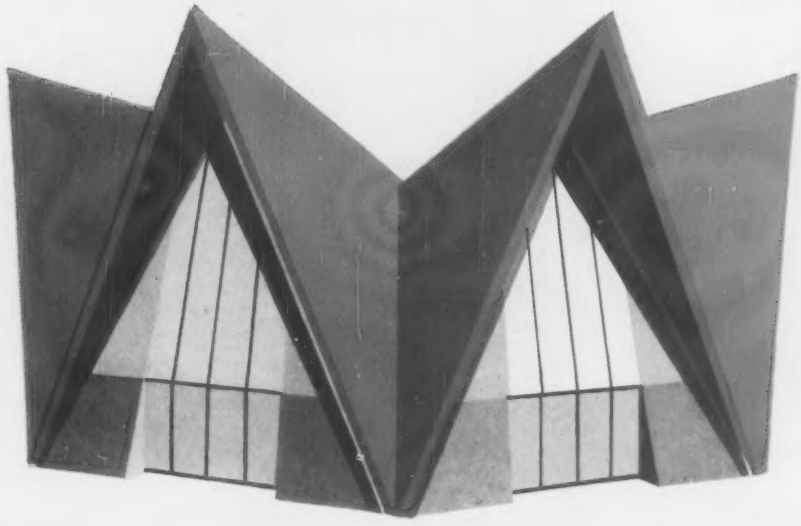


Bold new dimension in roof design:



NEOPRENE-HYPALON® ROOFING SYSTEMS

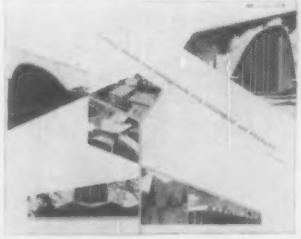
Daring innovations such as these . . . dramatic, exciting, unfettered by convention . . . are as *practical* today as they are beautiful. One reason: fluid-applied roofing based on Du Pont neoprene and HYPALON synthetic rubbers.

No longer need the limitations of conventional roofing materials be a barrier to fresh, original design. Neoprene-HYPALON roofing systems are ideal for difficult shapes, pitches, contours. Easily applied over most substrates, they cure quickly to flexible, tough, weathertight films with excellent resistance to heat and cold, sunlight, ozone, abrasion, oils, chemicals and flame.

As a roofing system, neoprene affords low-cost film build-up; HYPALON, a wide choice of stable, attractive topcoat colors. Moreover, either can be used alone. Although Du Pont produces only the synthetic rubbers—neoprene and HYPALON—that make this new roofing system possible, we'd like to spark your imagination further with the booklets shown here. To receive them, just write: E. I. du Pont de Nemours & Co. (Inc.), Elastomer Chemicals Department PA-11, Wilmington 98, Delaware.

• **Building with Elastomers** Quarterly publication packed with data on specific design and construction applications using Du Pont synthetic rubbers. Begin your subscription with this first issue devoted to fluid-applied roofing.

• **Colorful, Durable Roof Coatings Made with Neoprene and HYPALON** Complete details on performance, properties, and advantages of these new roofing materials. Excellent reference booklet. Yours for the asking!



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ELASTOMERS FOR ROOFING

DU PONT

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BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

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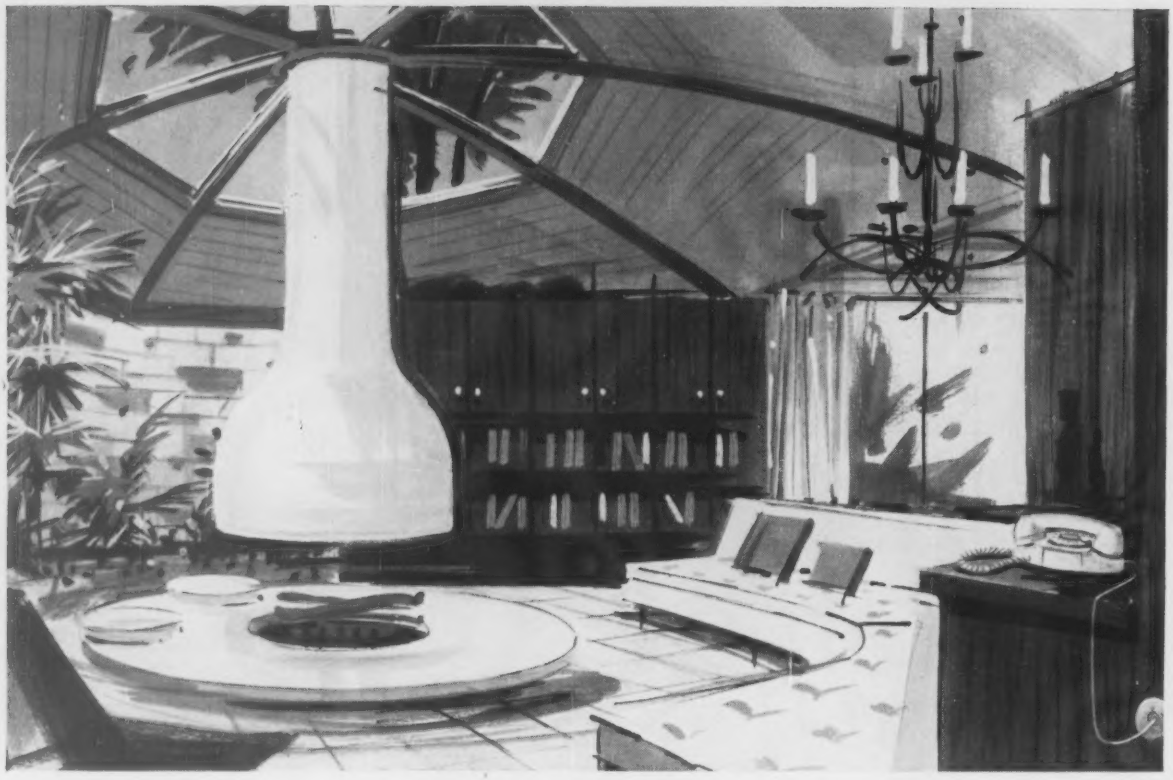
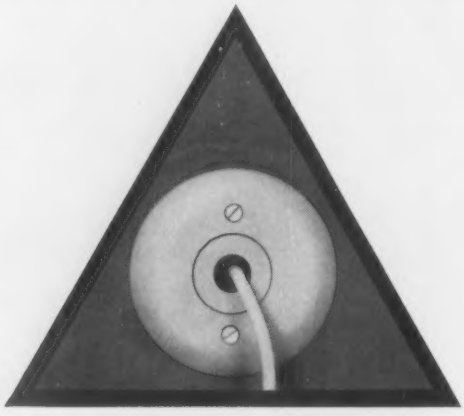


For details of home installations, see Sweet's Light Construction File, 11c/Be.

TELEPHONE PLANNING *makes homes more livable, more salable. When you specify built-in telephone outlets and wiring concealed within walls, you provide for a family's future telephone needs, protect the interior beauty of homes.* ***Bell Telephone System***



Call your local Bell Telephone Business Office for help in telephone-planning your homes.

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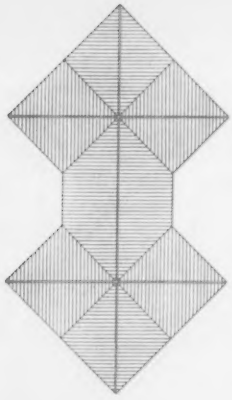
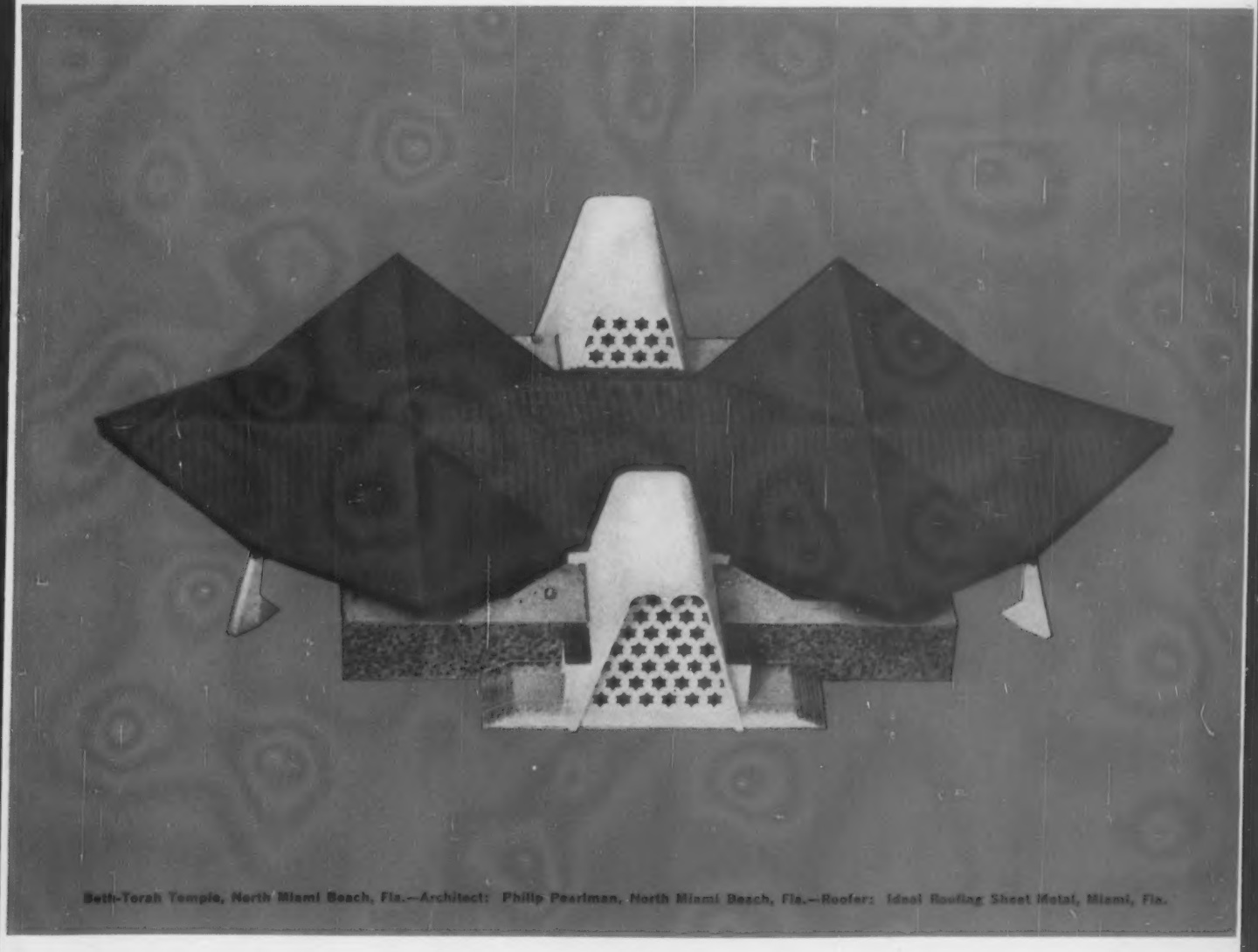


STARS OF TERNE . . .

FORM COLOR FUNCTION

The durability of Terne roofing is almost unique—its measurement of performance is in generations rather than years. This time-tested metal has other notable advantages . . . among these are a natural affinity for color and linear modulation which permits any visibly significant roof to become a basic component in design, a positive factor in architectural expression. And the cost can be surprisingly moderate. May we send you detailed literature?



Beth-Torah Temple, North Miami Beach, Fla.—Architect: Philip Pearlman, North Miami Beach, Fla.—Roofer: Ideal Roofing Sheet Metal, Miami, Fla.

FOLLANSBEE STEEL CORPORATION
Follansbee, West Virginia

Follansbee is the world's pioneer producer of seamless terne roofing

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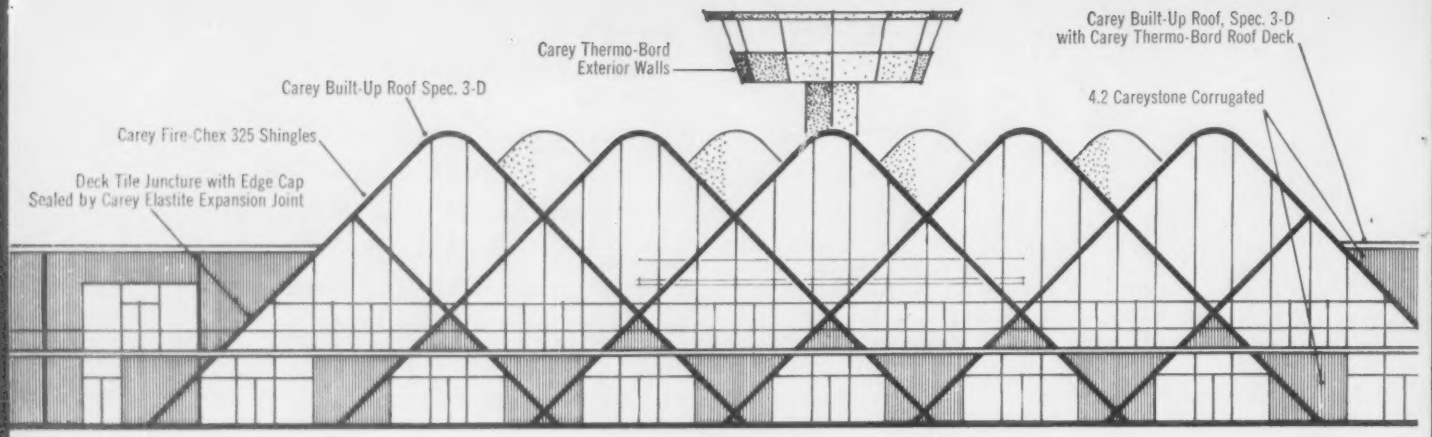
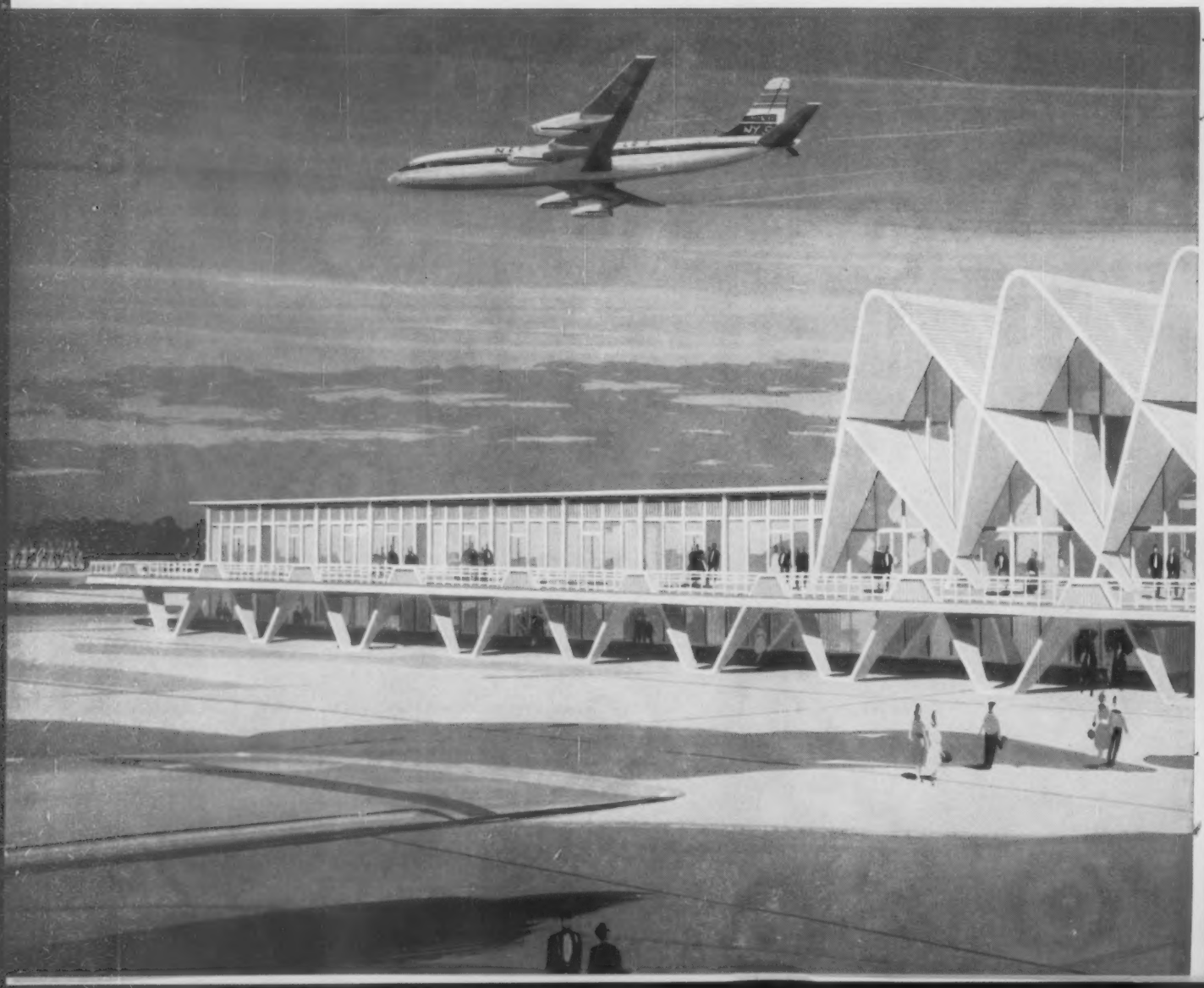
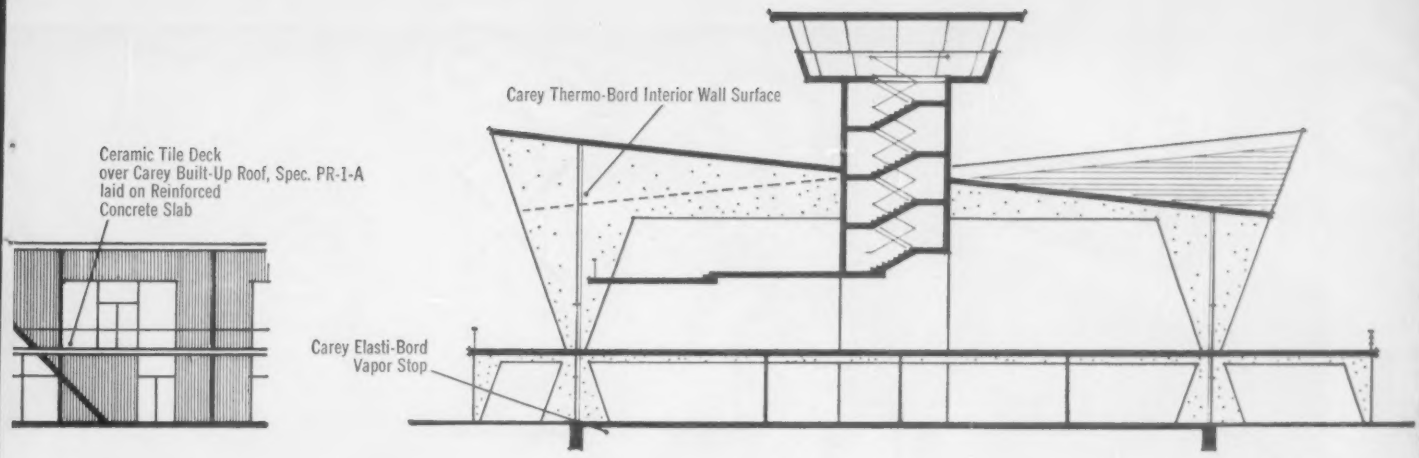

Carey Thermo-Bord
Exterior Walls
Carey Built-Up Roof Spec. 3-D
Carey Fire-Chex 325 Shingles
Deck Tile Juncture with Edge Cap
Sealed by Carey Elastite Expansion Joint
Carey Built-Up Roof, Spec. 3-D
with Carey Thermo-Bord Roof Deck
4.2 Careystone Corrugated

Kahn & Jacobs, a.i.a., design an air terminal

Observers familiar with air traffic expansion predict that more than 2000 jet transports, each carrying approximately 200 passengers, will fill the airways by the end of the decade of the sixties. To these transport flights must be added a growing number of private passenger planes which even today total more than 75,000. These figures do not take into account the non-jet flights which airlines are expanding to serve an increasing number of communities.





In view of this prospect of burgeoning passenger traffic, through airports which are barely adequate for present-day needs, the architectural firm Kahn & Jacobs, A.I.A., of New York City designed their prototype air terminal under a commission from Carey.

The details of this Kahn & Jacobs project suggest uses for a number of Carey building products. The purpose of the detail drawings is to propose solutions for similar problems which could show up on the boards in any office, anytime. Carey materials specifications as incorporated in the Kahn & Jacob details have been assembled in a convenient file folder for your personal use. May we send you a copy? Write Dept. PA-1161, a postcard will do.

Carey®

The Philip Carey Mfg. Company Cincinnati 15, Ohio

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Economically and simply, wood works beautifully in large moderns, too. The planked decking and sturdy railing of the porch, the interesting geometric patterns of wood-framed windows and panels, the smooth plank-and-beam overhang of the roof . . . all complement one another perfectly, suit their site naturally. Architects: Smith and Williams, A.I.A.

For homes that endure structurally, decoratively

find the better way with WOOD

Beveled siding and louvered shutters create horizontal shadow lines that bring this familiar New England design closer to the ground. The shingled roof, arched breezeway further champion wood's charm.

Whether conventional colonials or unusual contemporaries, homes made of wood are traditional favorites . . . for many reasons. For instance, wood's wonderful workability fulfills any dimensions in your design, any economies in your planning. Its beauty is apparent in a weathered shingled roof or a stained peg-planked floor. The inherent strength of wood is a hidden but known value in every supporting member throughout the house.

Wood's acoustical qualities help tone down sound from room to room. Its natural insulating characteristics help retain comfortable temperatures from season to season. Properly applied, wood's diverse grains and tones harmonize perfectly with materials of every kind. Correctly cared for . . . it has the ability to mellow with age, the durability to shelter generations. For more information on designing with wood, write:

NATIONAL LUMBER MANUFACTURERS ASSOCIATION
Wood Information Center, 1319 18th St., N. W., Washington 6, D. C.

nlma

for freedom of design, look to **wood**

At home in the hills, this contemporary extends its warm welcome with lengthy laminated members and solid crossbeams over an informal patio . . . open to the sun on one side, closed for shelter on the other. Note the strong vertical lines of board-and-batten siding. Cliff May, designer and builder.

For more information, turn to Reader Service card, circle No. 371

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FOR ARCHITECTURE

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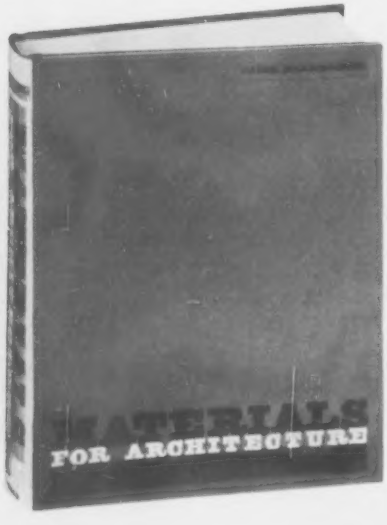
plus cross references (over 900) to help locate any material, process, finish, etc.



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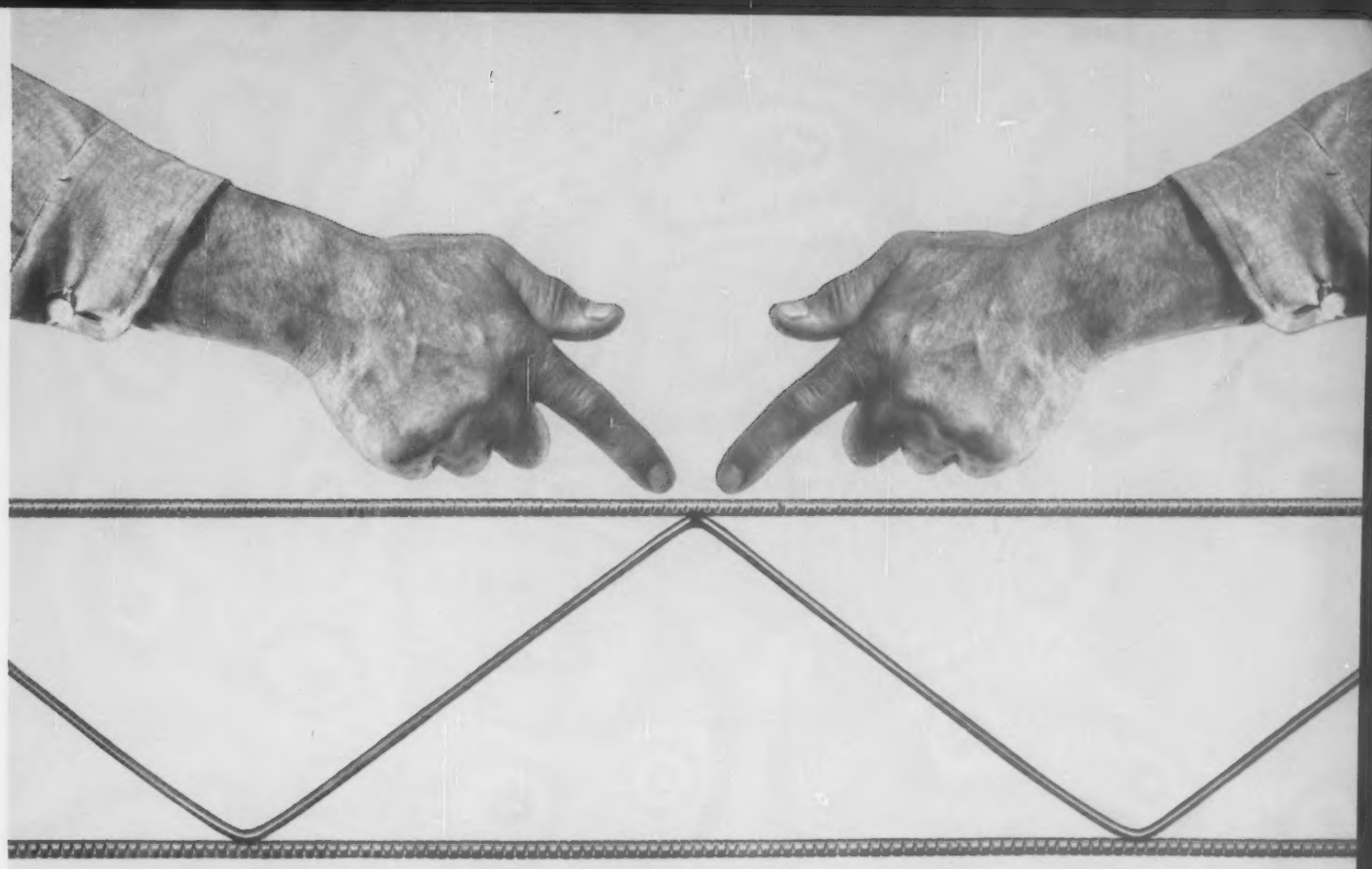

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the masonry wall reinforcement with the trussed design

Don't be misled by the common habit of calling all metal-rod reinforcement "durowal". Look for the trussed design. This distinguishes the real Dur-o-wal, insures maximum flexural strength, with all steel members effectively in tension and working together.

Impartial tests have proved that truss-designed Dur-o-wal exceeds accepted standards—increases the flexural strength of a masonry wall 71 to 261 per cent, depending on weight Dur-o-wal used, type of mortar, number of courses.

A study by the Armour Research Foundation indicates that Dur-o-wal tied walls outfunction brick-header tied walls. Write to any Dur-o-wal address below for a copy of Armour's 44-page report.

Two engineered products that meet a need. Dur-o-wal reinforcement, shown above, and Rapid Control Joint, below. This ready-made control structure flexes with the wall. Recommended by construction engineers especially for concrete block.

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fast...proven...economical

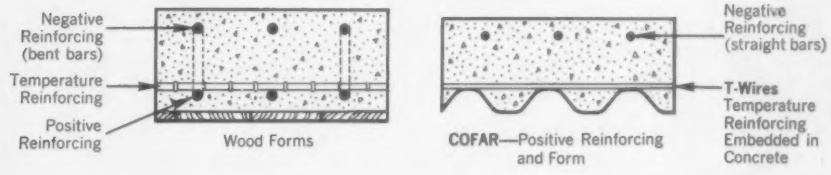
HERE IS CONSTRUCTION SPEED.

As soon as the men (see photograph) place Cofar units they are providing:

1. Positive and temperature reinforcing
2. Form for wet concrete
3. Working deck during construction.

Cofar goes down fast. No wood forms. No bottom rebars. No temporary safety staging. Work stays on schedule. Less supervision and inspection.

CONVENTIONAL SLAB VS. COFAR SLAB



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One system satisfies a variety of load and span conditions throughout the entire building. One design procedure. Simplified drawings. With Cofar, T-wires welded across corrugations of the high-strength galvanized steel units assure horizontal shear transfer from concrete to steel. The T-wires are **embedded** in concrete. Cofar slabs are designed in accordance with A.C.I. principles for reinforced concrete. Conventional formulas apply. Cofar is the time-tested and job-proven reinforced concrete system: fire tested (up to 4-hour UL fire ratings), structurally tested (for static, repeated, concentrated and diaphragm loads). Best insurance rates available. Specify Granco Cofar with confidence—save time and money every step of the way. You get fast, dependable delivery of Cofar and helpful field service. Over 100 Granco distributors throughout the U. S.

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COMBINED FORM AND REINFORCEMENT FOR CONCRETE

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GRANCO VIN-COR • S-I-P BRIDGE FORMS®
PAVEMENT JOINTS • FREE FLOW SUBDRAIN

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GRANCO STEEL PRODUCTS CO., 6506 N. Broadway, St. Louis 15, Mo. A Subsidiary of Granite City Steel Company

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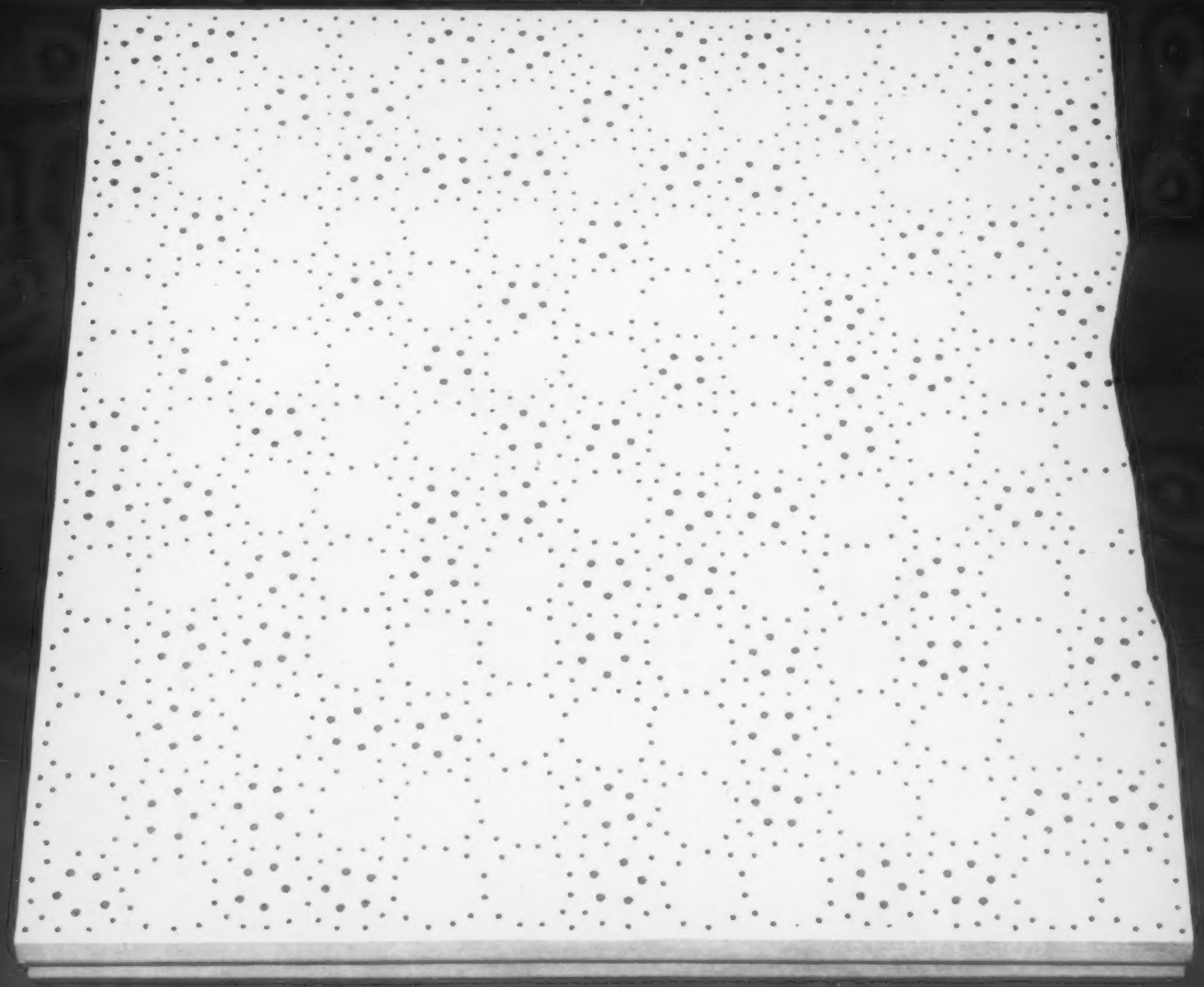

"a beautiful, versatile pattern!"

NEW Tiffany*

Acoustical Tile by CELOTEX

Elegant Tiffany... new inspiration for the creative designer of modern functional-yet-beautiful ceilings! Interesting in detail... monolithic in effect... this exclusive new perforation pattern brings an entirely new look to ceilings.

Tiffany

PROTECTONE† UL FIRE-RATED MINERAL FIBER TILE. The PROTECTONE family of fire-retardant tiles for UL time-rated ceiling assemblies... already widely varied in texture and pattern... proudly adds Tiffany (2-hour rated; concrete deck over steel bar joints).

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INCOMBUSTIBLE MINERAL FIBER TILE
Appropriate in almost any surroundings, new Tiffany adds fresh beauty and interest to the broad line of Acousti-Celotex mineral fiber tiles... famous for high sound absorption, high attenuation value, beauty, incombustibility, and ease of maintenance.

ALSO IN FIBERBOARD TILE, this exciting new pattern is available in HUSH-TONE® "Bolero." 12" x 12" and 12" x 24" sizes, with famous EZ tongue-and-groove joint.

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*U. S. Design Patent No. D-191,203
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Montreal, Quebec

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6166

Whatever the room, whatever the building – there's a Marlite Paneling to do the job best

Marlite is ideal for residential interiors, but it also provides outstanding beauty, durability, variety of sizes and economy in offices, restrooms, stores, restaurants, medical buildings, schools, churches, and many more.

Beauty? You can select from a wide variety of fashionable colors, luxurious Trendwood® reproductions, marble and decorator patterns.

Durability? Unlike many "finished" materials, Marlite's baked plastic finish provides remarkable resistance to grease, stains, mars, dents—even heat.

Sizes? Choose from large 4x8 sheets; 16″ wide tongued and grooved Marlite planks and blocks; rigid 5/8″ thick hollow-core Marlite Korelock 2x8 panels, tongued and grooved on all edges.

Economy? Marlite is reasonably priced, and installation is fast and easy. When Marlite is up, the wall is finished. No painting or further protection —ever. And Marlite stays like new for years with an occasional damp cloth wiping.

Get complete details from your building materials dealer, Sweet's File, or write Marlite Division of Masonite Corporation, Dept. 1114, Dover, Ohio.

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plastic-finished paneling

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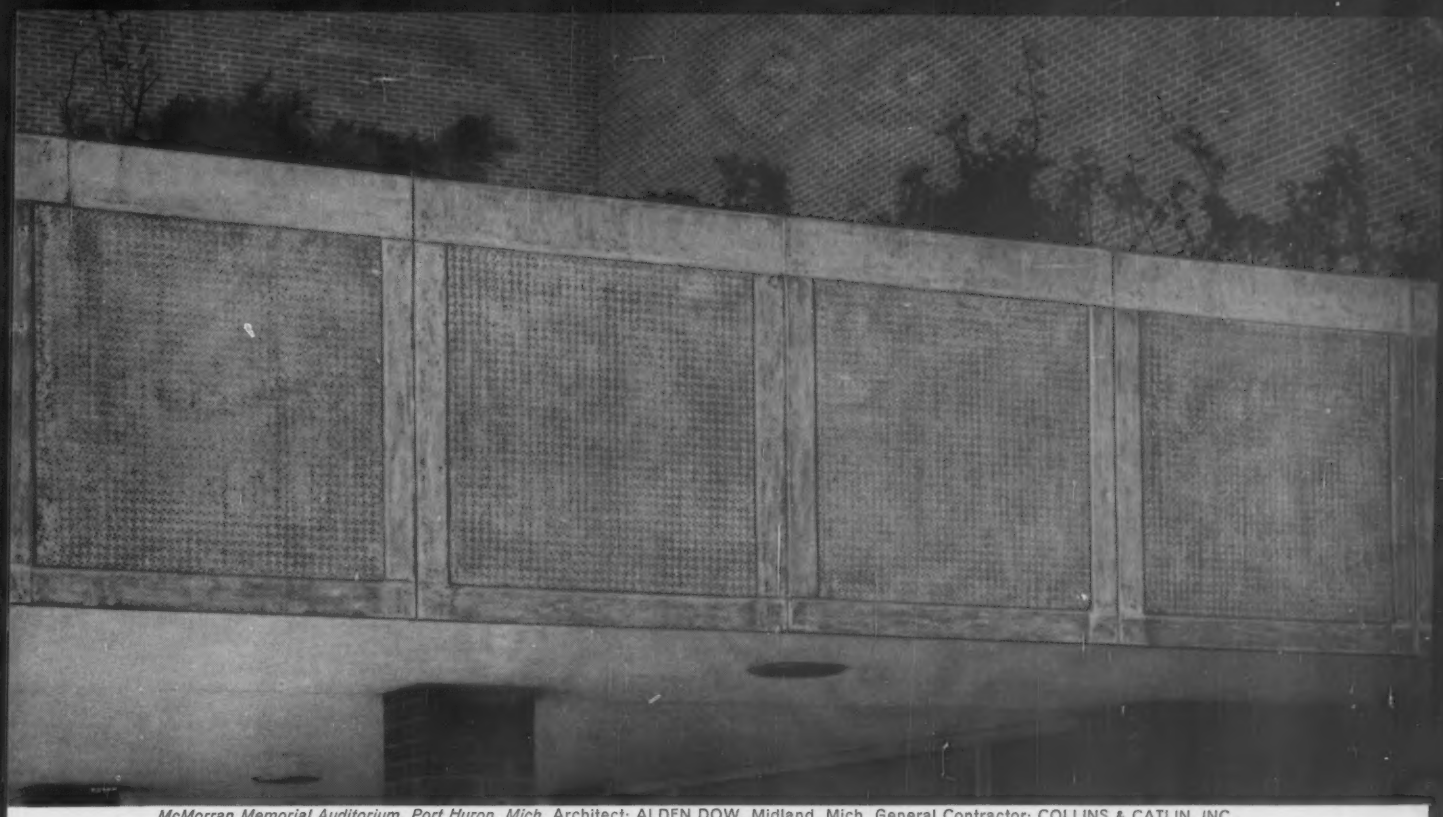

McMorran Memorial Auditorium, Port Huron, Mich. Architect: ALDEN DOW, Midland, Mich. General Contractor: COLLINS & CATLIN, INC., Port Huron. Fabricators and Erectors: MAUL MACOTTA CORPORATION, Detroit.

Exciting new design role for Revere Copper

Maul Macotta Corporation Panels Feature Unusual "Planter" Façade

To finish off the two entrances of this building, the architect could have used any material he wished. But he asked himself what would be the most striking treatment, yet still be in keeping with the architecture of the building proper.

His answer? The unusual "planter-type" facade you see here. It is faced, not with plain copper panels, but with embossed panels framed with smooth copper. The attractive "aged" effect was secured when the contractor applied an artificial patina.

Practically unlimited design possibilities become available when you design with copper, as in this project. So easy to work with and form, so versatile in its application possibilities, copper offers the architect challenging opportunities in design and virtually no limitations on his thinking. No wonder it is so practical to "Design with copper in mind."

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.
Mills: Rome, N.Y.; Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles, Riverside and Santa Ana, Calif.; New Bedford and Plymouth, Mass.; Brooklyn, N.Y.; Newport, Ark.; Ft. Calhoun, Neb. Sales Offices in Principal Cities.
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The two entrances of the building used 5,000 pounds of Revere sheet copper in .032" gauge. 48" x 48" panels were installed by MAUL MACOTTA CORPORATION over a backing of ½" light-weight aggregate concrete. Interlocking tongue and groove joints made of brass strip were installed on all four sides of the panels.

UUR 990

Trenridge Apartments, Lincoln, Nebraska. Architects: Sidney W. Campbell and Reginald E. Davies.

Creative use of Andersen Windows accents entry design of 126-unit apartment complex

Stock window units, proportioned in a two-story panel, combine beauty, comfort and dependability

In the new Trenridge Apartments, Lincoln, Nebraska, combination Andersen casement and picture windows are used to complement distinctive styling while adding extra value for owner and occupants.

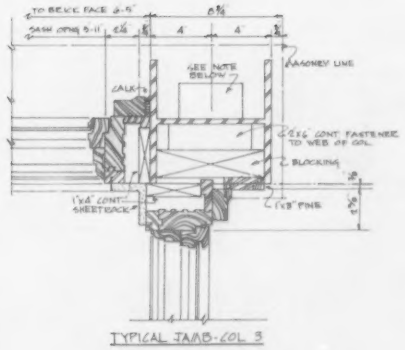
For the owner, these extra-weathertight windows (more than 3 times industry standards) will mean significant savings in heating and cooling costs . . . and lasting tenant satisfaction. And occupants will like the way Andersen wood windows provide weathertight comfort the year around. (The entire project is equipped with Welded Insulating Glass.)

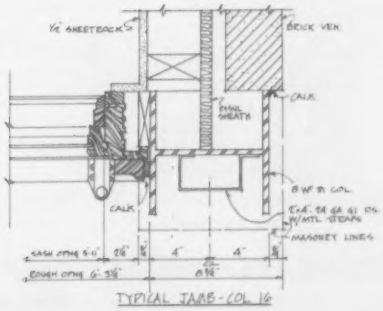
Andersen's complete line of windows offers maximum design flexibility for your next light construction project. There are 7 kinds of windows, 30 different types, and more than 600 cataloged sizes.

Check Sweet's File or write for Detail catalog and Tracing detail files. Andersen Windows are available from lumber and millwork dealers throughout the United States and Canada.

Andersen Windowalls
TRADEMARK OF ANDERSEN CORPORATION

ANDERSEN CORPORATION
BAYPORT, MINNESOTA





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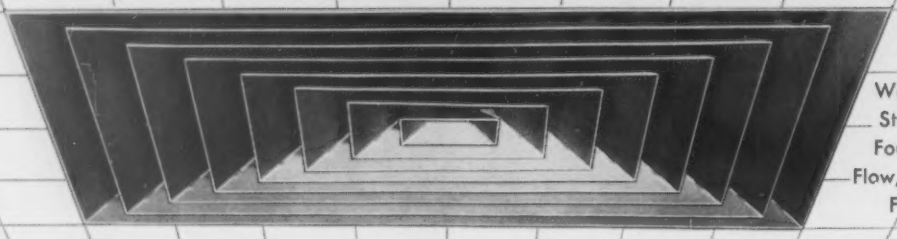
THE FIRST ALL EXTRUDED ALUMINUM TYPE D DIRECTIONAL DIFFUSER

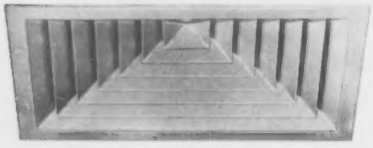


Waterloo Style DE Four Way Flow, Snap-in Frame

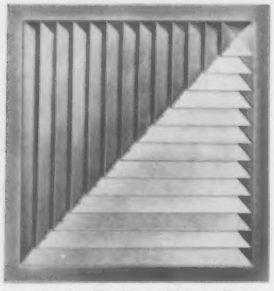
SQUARE and RECTANGULAR DESIGNS

Waterloo Style DM One Way Flow Bevelled Frame

Waterloo Style DD Two Way Opposite Flow Drop Collar Frame



Waterloo Style DF Three Way Flow Flange Frame



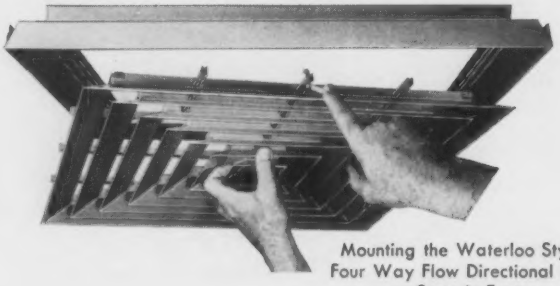
Waterloo Style DL Two Way Corner Flow Lay-on Frame

★ **EASIEST TO INSTALL**

★ **ONE-THIRD THE USUAL WEIGHT**
because of aluminum construction

★ **LONG-LASTING**
All extruded aluminum

★ **5 FRAME STYLES • 14 CORE PATTERNS**
All cores removable and interchangeable



Mounting the Waterloo Style DE Four Way Flow Directional Diffuser Snap-in Frame

DESIGNED BY WATERLOO
... pioneer in development of air diffusion equipment in EXTRUDED ALUMINUM

PERFORMANCE PROVED BY ANEMOSTAT
in the finest laboratories in the air conditioning industry

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WATERLOO *Air Diffusion* EQUIPMENT

WATERLOO REGISTER COMPANY, INC.

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For more information, circle No. 329 ➤

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discovered
the magic of...

madagaska

VICRTEX V.E.F.* VINYL
WALLCOVERINGS & UPHOLSTERY FABRICS

You'll find Madagaska in hotels, offices, schools, homes, hospitals...on walls and furniture...*everywhere* you look. Like the native straw that inspired it, Madagaska weaves a magic, tri-dimensional spell of the tropics. Amazingly care-free and virtually indestructible, this modern vinyl fabric keeps its refreshing good looks for years... eliminates periodic redecoration expense. Its range of 40 colors matches every decorating mood. ■See why Madagaska ...one of the first Viertex VEF Original Designs...is *still* one of the most popular. Write for sample swatches, prices and colorful "Walls of Fame" Brochure. ■New! The *first* "Data Book" on SPECIFICATION, SELECTION AND USE of vinyl wallcoverings now available. Write for your copy TODAY!

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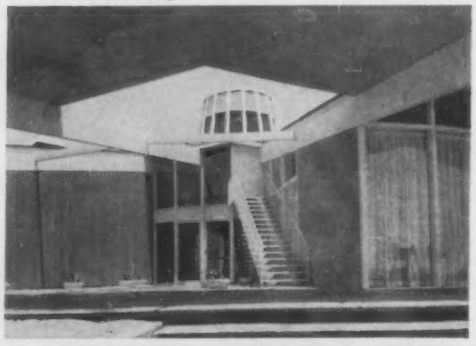
Mills: Wharton, N.J. • *In Canada:* Shawinigan Chemicals Ltd., Canadian Resins Div., Montreal, Que. & Weston, Ont.

All Viertex Fabrics U/L Approved.

designed with laminated wood

Research House, Flintridge, Calif., constructed with Rilco laminated wood beams and columns. Architect: John C. Lindsay, AIA, Los Angeles. Contractor: Norwood & DeLonge, San Marino, Calif.

Below—Salton Rivera Hotel & Yacht Club, Salton Sea, Calif., constructed with Rilco laminated wood beams. Architect: Richard Dorman, AIA, & Associates. Contractor: Noxon Construction Co., Los Angeles.



The design freedom of wood when laminated by Rilco is unlimited. Versatile Rilco arches, beams and purlins are easily adapted to any architectural concept – make dramatic accents possible at a surprising low cost. And clients are especially pleased with the warm, natural beauty of carefully finished Rilco laminated wood structural members. Rilco field sales engineers will be happy to consult with you, without obligation. **Write Weyerhaeuser Company, Rilco Engineered Wood Products Division, Box B3, Tacoma, Washington. District Offices in Linden, N. J.; Fort Wayne, Ind.; St. Paul, Minn.**

Weyerhaeuser
RILCO ARCHES and BEAMS

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This is our trademark. As with most trademarks, it was originally conceived as our product identification. And it has served this function, in various forms, in many of the usual ways and places. But during the past ten years of its use, it has taken on another meaning. To many in the architectural lighting industry, this G has assumed a new role—that of the standard of performance and design. The numerous architect-specifications that read "Gotham Lighting or equal" are testimonials to this. And while this in itself is indeed gratifying to us, more significant to you, we hope, is the indication of an attitude that demands, of this company and its men, this high level of quality in the equipment manufactured by the **GOTHAM LIGHTING CORPORATION.**

37-01 Thirty-first Street, Long Island City, N.Y.

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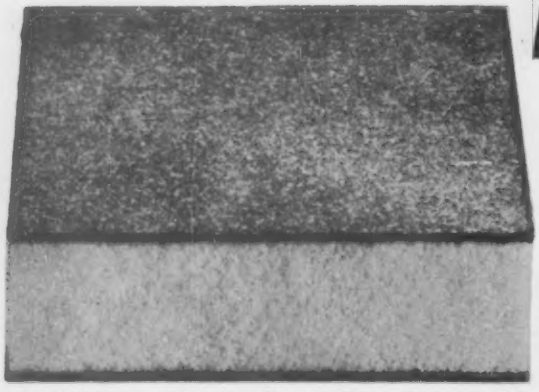
NEW BARRETT URETHANE ROOF INSULATION PROVED TO BE TWICE AS EFFICIENT AS ITS NEAREST COMPETITOR!



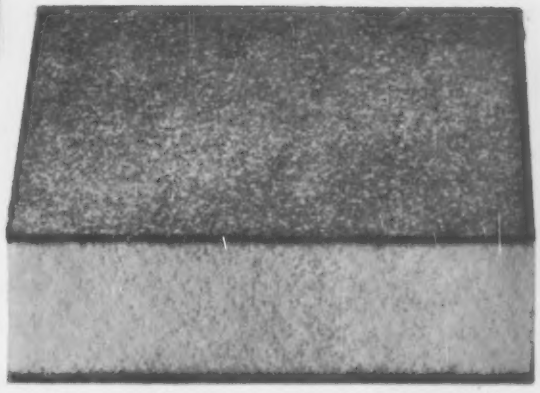
And these 7 benefits will tell you why: 1. BARRETT urethane roof insulation has a C value of .13 (average values of its competitors range from .27 to .40). 2. BARRETT urethane is recommended where roof insulation requirements must be the best (such as air conditioned, cold storage and electrically heated buildings). 3. BARRETT urethane, sandwiched between two Barrett asphalt coated and impregnated base sheets, provides roofers*

*Insulating efficiency based on 1 inch of foam plus roofing base sheets.

BARRETT DIVISION
40 Rector Street, New York 6, N. Y.

Allied Chemical

NEW BARRETT URETHANE ROOF INSULATION PROVED TO BE TWICE AS EFFICIENT AS ITS NEAREST COMPETITOR!



with a walk-on, work-on surface (also, helps the urethane retain its insulating value). 4. The only urethane designed for roof insulation. 5. Does not absorb water. 6. Won't bend, buckle, or melt when mopped with hot pitch or asphalt. 7. Acceptable as a base for Barrett bonded roofs! If interested in free samples and more information, write in today!

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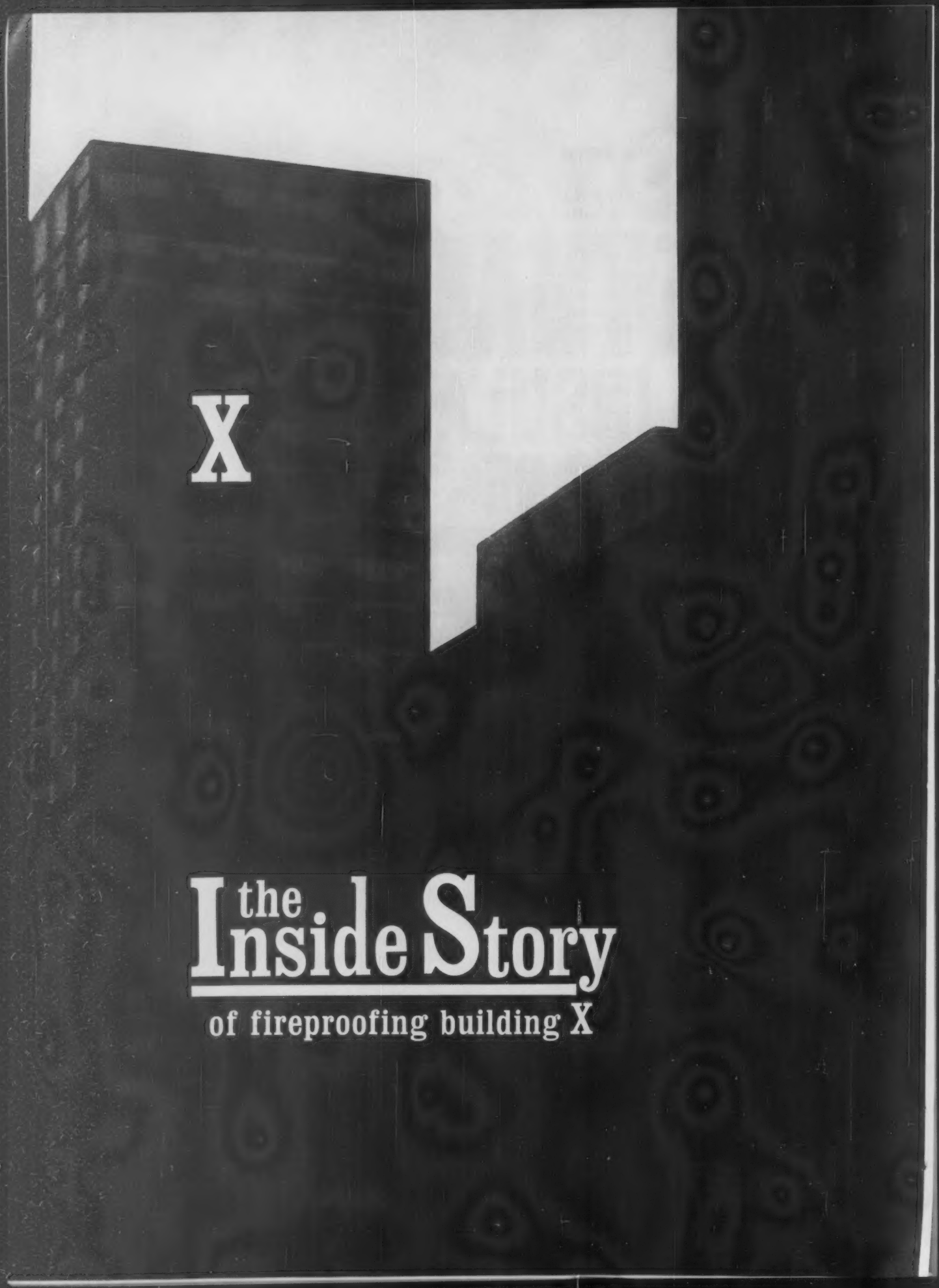
X
the Inside Story
of fireproofing building X

The principal characters shall remain anonymous because we don't want to get anyone in trouble... especially ourselves

On a 20-plus story building in the city of X, the architect had specified either Type B spray-on fireproofing, or Zonolite Mono-Kote for building X.

The general contractor suggested to the plastering contractor that he use the Type B spray-on fireproofing. So the plastering contractor, eager to oblige, ordered a supply of Type B, and his men dutifully began to spray it on.

Now, be it understood that Type B is a respectable product, manufactured by one of the giants in the field, scientifically tested and all that. You read all the time about how good it is.

Except that the nozzle men spraying the stuff on didn't think so. It didn't stick to the lower edge of the beam flanges. It was hard to build up even to ⅜" on the first coat. And there was so much rebound that the nozzle men were getting coated as well as the beams.

When the nozzle men threatened to quit, the plastering contractor decided to try Mono-Kote, though the general contractor tried to dissuade him (verbally; no firearms).

The nozzle men found that on the first pass, they could apply Mono-Kote at least ½" thick to the beams, and a full ⅞" thick to the contour floor.

Within minutes, Mono-Kote was so firmly set that the nozzle men could come back for the second (and final) pass to build the coat to the desired thickness.

The story has all sorts of happy endings. The plastering contractor was happy because he did a good job fast. The general contractor was delighted because the work waiting for the fireproofers to finish was able to begin sooner than he had planned. Even the nozzle men were happy . . . they stayed clean, not coated, working with Mono-Kote.

In many advertisements they are willing to give you the name on request if you write in. Not us. Not even if you say "please." No names mean no trouble.

Story's over; now for a few more pertinent facts. Aside from the speed and excellent application characteristics of Mono-Kote, you use less material; 1" for a three hour fire rating on beams, 1¼" for a five hour rating.

On your next job, specify what you will or Zonolite Mono-Kote. We'll be happy to take on all comers. For complete information about Mono-Kote, write for Bulletin PA-53.

ZONOLITE COMPANY

135 SOUTH LASALLE ST., CHICAGO 3, ILLINOIS

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NEW ENGLAND MUTUAL LIFE INSURANCE COMPANY

Bronze casement sash — two generations of custom-engineered windows by

GENERAL BRONZE

One of Boston's architectural landmarks—the Home Office of the New England Mutual Life Insurance Company — has gained new stature through meticulously designed additions to the original building. General Bronze engineered and produced the bronze casement windows for the initial structure . . . was called on again to design and fabricate a modern but completely compatible window system for the additions.

Architects: Hoyle, Doran and Berry
Contractor: Turner Construction Company

When you consider window or curtain wall systems . . . in aluminum, bronze or stainless steel . . . think also of the design and engineering services only General Bronze can offer you. With close to a half-century's experience in architectural metalwork and fenestration, GB is uniquely equipped to help you realize the benefits and avoid the pitfalls of this highly specialized field.

For additional information, consult your Sweet's files . . . call in the General Bronze representative nearest you . . . or write to: General Bronze Corporation, Garden City, N. Y. Sales Office: 100 Park Avenue, New York, N. Y.

PERMATITE DIVISION—Custom-built Windows, Curtain Walls, Architectural Metal Work and Revolving Doors. ALWINTITE DIVISION—Stock-size Aluminum Windows and Doors. BRACH MFG. CO. DIVISION—Radio, Television and Electronic Equipment. STEEL WELDMENTS, INC. DIVISION—Custom Fabrication in Steel and Iron.

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THE GAS INDUSTRY ANNOUNCES . . .

A MAJOR BREAKTHROUGH IN COOLING & HEATING

ARKLA'S NEW 25-TON GAS CHILLER-HEATER

Here it is – the revolutionary new Arkla absorption unit that heats and cools without a steam producing boiler or converter. Gas-fired burners in the generator section energize the system for absorption cooling, or for heating. It's the perfect system for modern year 'round gas air conditioning.

INSTANTLY HEATS AND COOLS AUTOMATICALLY ◀ HEATS WATER WITHOUT A BOILER ◀ COOLS WATER WITHOUT A COMPRESSOR ◀ REQUIRES NO LUBRICATION ◀ SEALED FOR LIFE, REQUIRING MINIMUM MAINTENANCE ◀ MAINTAINS SAME CAPACITY FOR THE LIFE OF THE UNIT ◀ HAS NO MOVING PARTS IN THE HEATING AND COOLING CYCLE ◀ FIRST MEDIUM OR LARGE TONNAGE AIR CONDITIONER THAT HEATS.

Truly revolutionary... investigate for your next building project the new Arkla DF-3000 Gas-Fired All Year* Chiller-Heater.

For details contact your local Gas Company. Or write Arkla Air Conditioning Corporation, 812 Main Street, Little Rock, Arkansas.

American Gas Association

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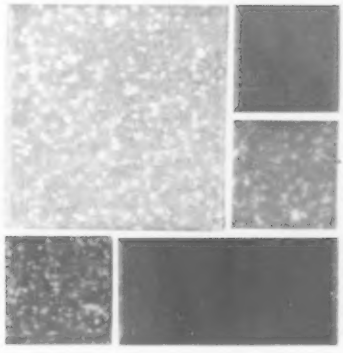
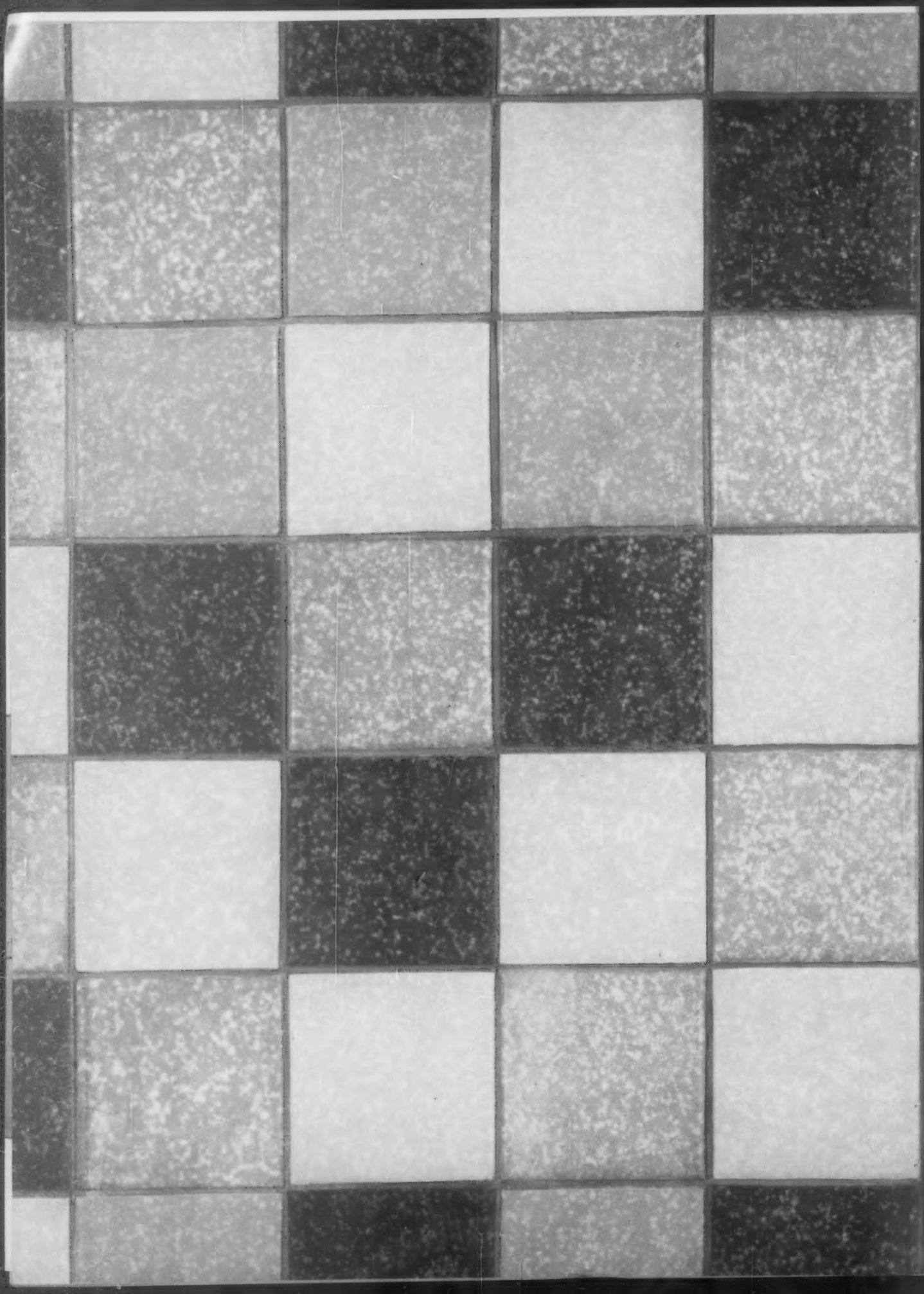
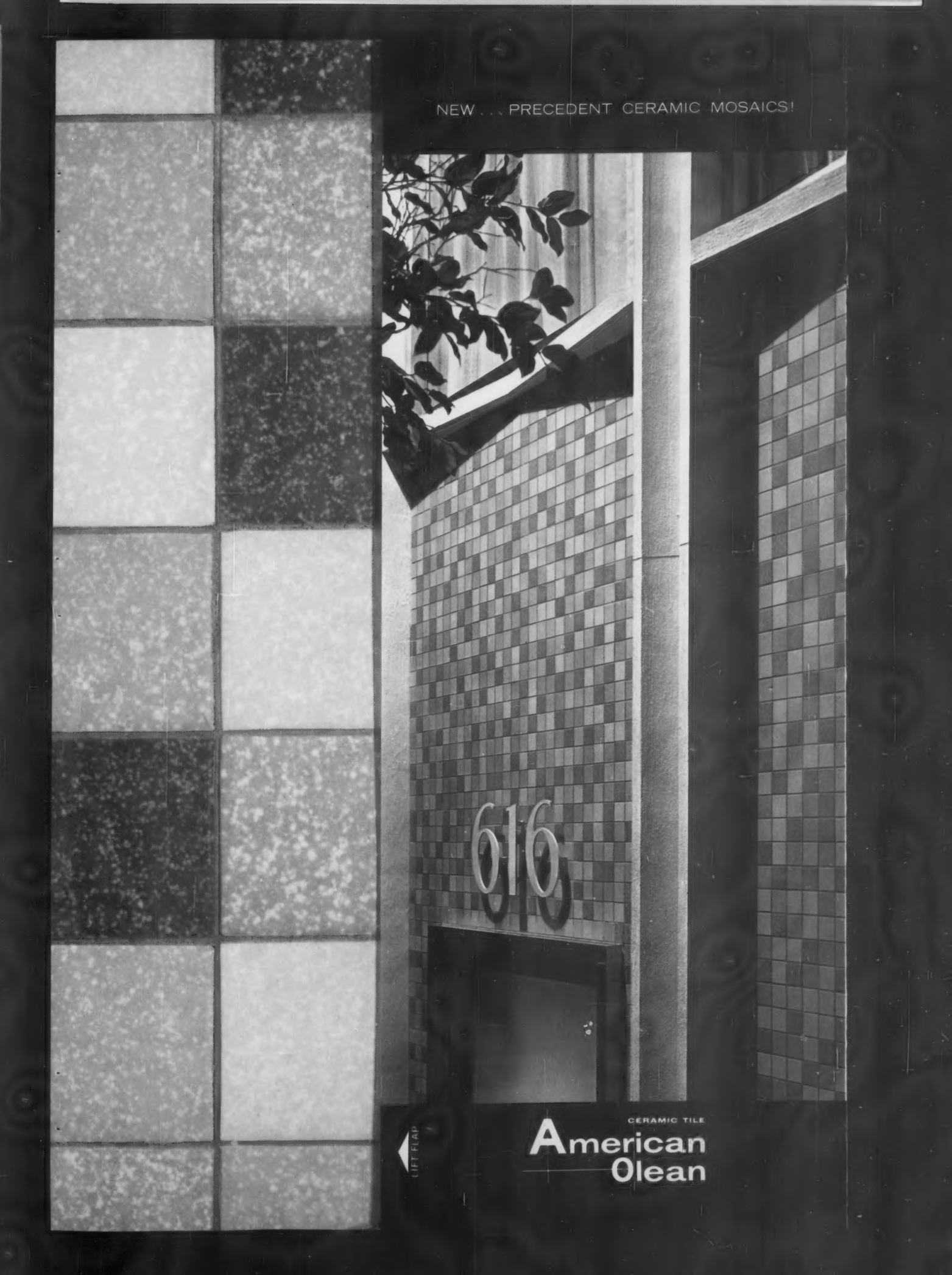


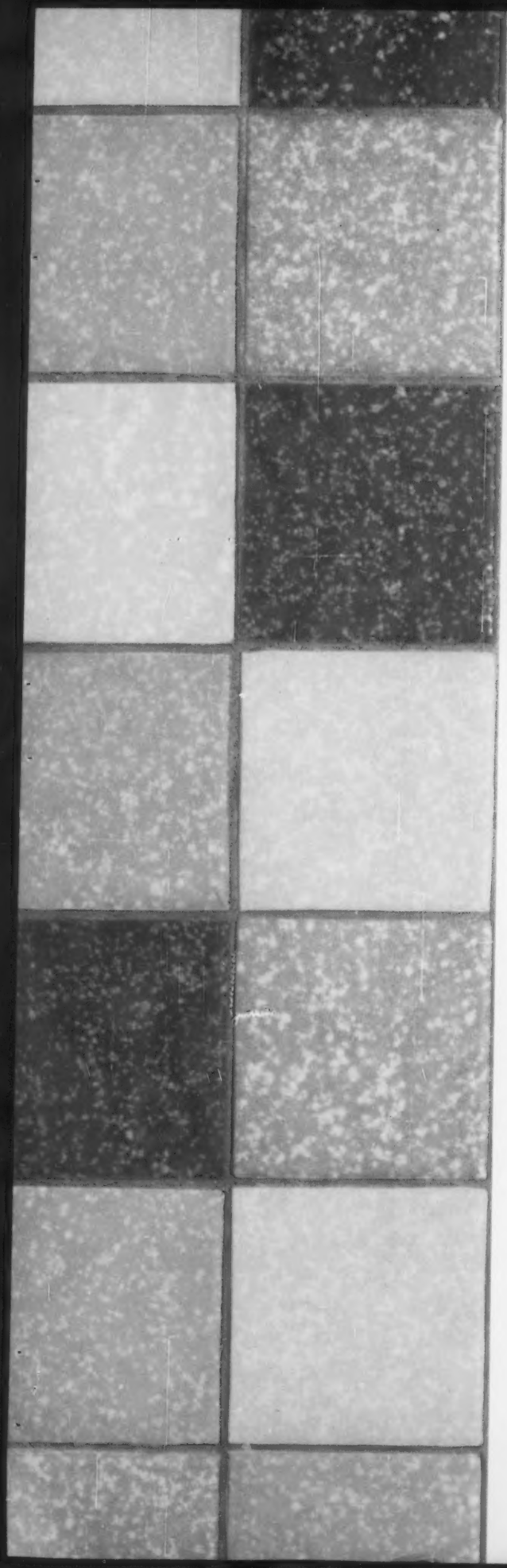
presenting the NEW

Precedent Collection of Ceramic Mosaics

CERAMIC TILE
American Olean




NEW . . . PRECEDENT CERAMIC MOSAICS!
616
LIFT FLAP
CERAMIC TILE
American
Olean



The All N

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CERAM
Brighte
Colors
New P

54 New Precede
Clearline* and
colors, plus 12
most complete
mosaics.

53 New Patterns
tions of colors, s
the widest scope
wall and floor des

Clearer, Purer
methods give co
before achieved.

Planned Color Ha
Precedent colors
American Olean g
it easier to work ou

Made in Modula
mosaics are made
and 2″ x 2″ unit

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Reproduced full size is
This same pattern is
exterior spandrel. (Pla

Am

See next page for a few c

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CEDENT
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ter, Purer
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cedent Colors—28 beautiful new nd 14 richly textured Texline* 12 sparkling Accent colors. The ete color selection in ceramic

erns—completely fresh combina- rs, shapes and textures offering cope for both interior and exterior r designs.

rer Colors—new manufacturing e colors a purity of tone never ved.

or Harmony with Glazed Tile—all lors are closely coordinated with an glazed tile colors, which makes rk out pleasing color combinations.

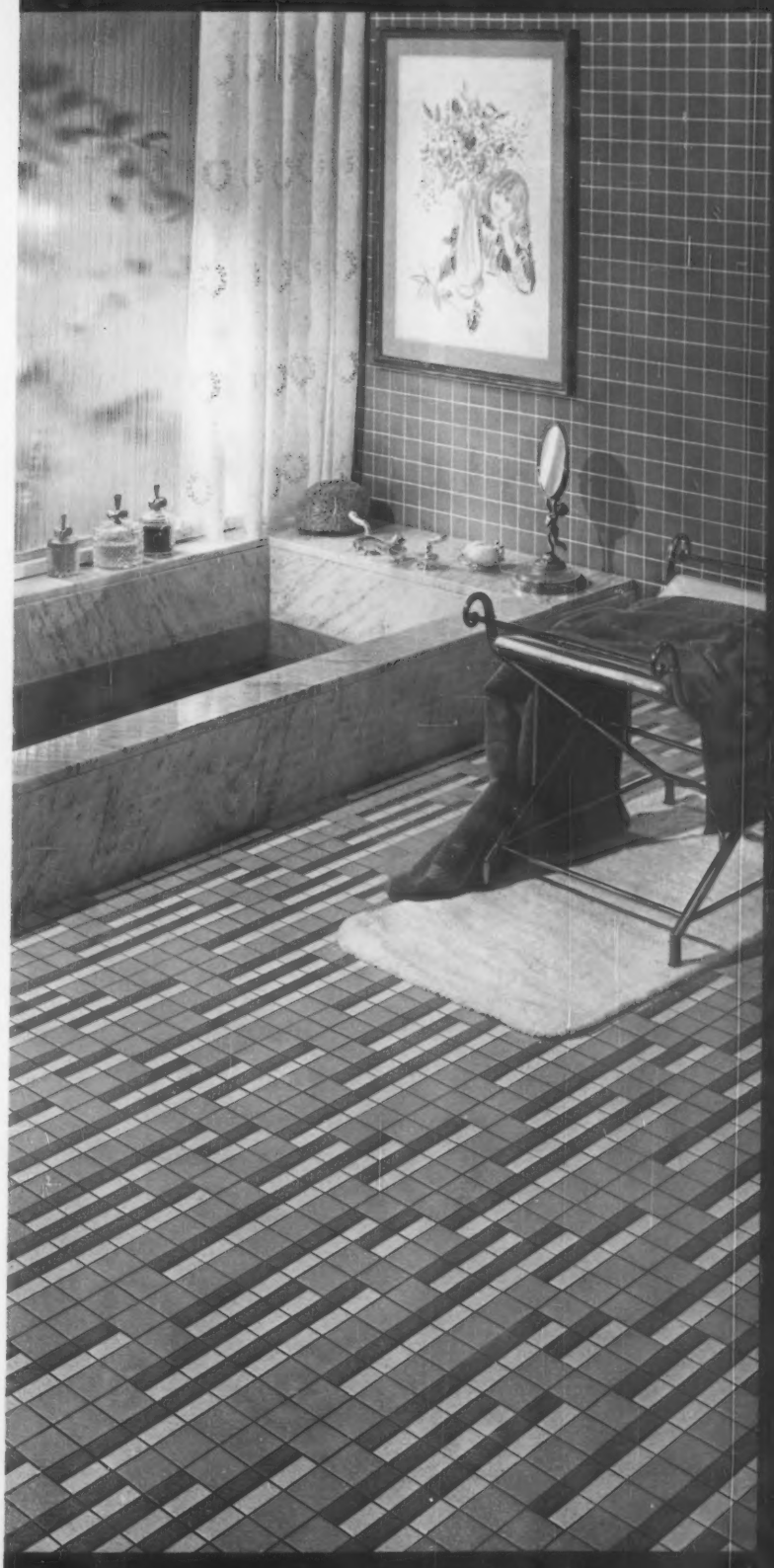
dular Sizes—Precedent ceramic made in modular 1″ x 1″, 2″ x 1″ units.

size is Precedent Texline Blend P21-2178. rn is illustrated in the photograph of the . (Plate 449)

CERAMIC TILE

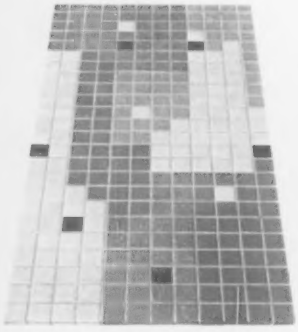
American Olean

a few of the many new Precedent patterns.

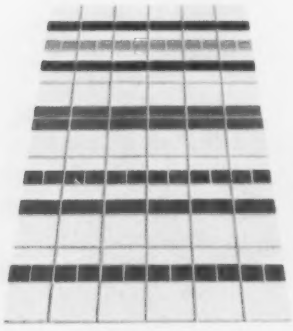


Bathroom floor is Precedent Stripe P32-2395. Wall: Scored Design SD-5 in 310 Cr. Blue. (Plate 124)

Typical new Precedent Ceramic Mosaic Patterns selected from American Olean's new Booklet 561



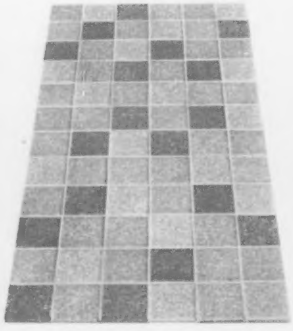
Designer Pattern P2-2424



Designer Pattern P6-2280

NEW DESIGNER PATTERNS

Texline Blend P14-2178



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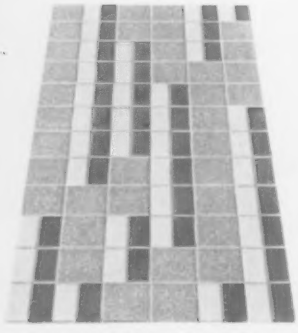
NEW TEXLINE BLENDS



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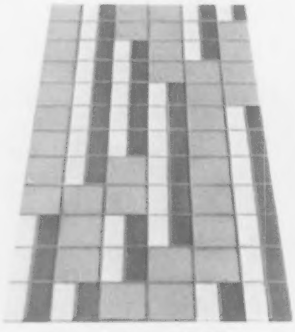

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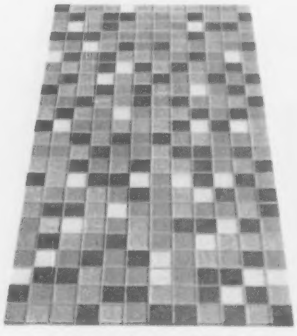

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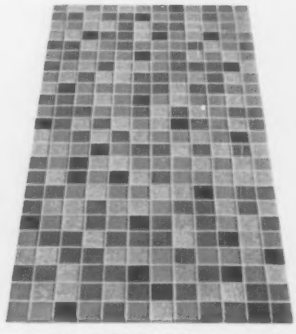

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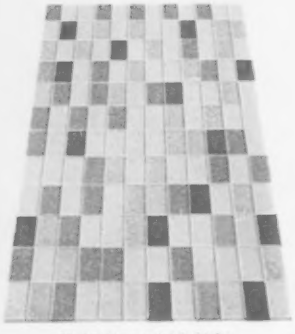
NEW 1 x 1 BLENDS*



2"x1" Blend P45-3191

2"x1" Blend Pattern P50-3191

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PROGRESSIVE ARCHITECTURE NOVEMBER 1961

NEWS REPORT

Architecture's Monthly News Digest of Buildings and Projects, Personalities, New Products

Photo: Alexandre Georges

Chase Manhattan branch bank in Great Neck, N.Y., by The Architects Collaborative, appears as a concrete pavilion.

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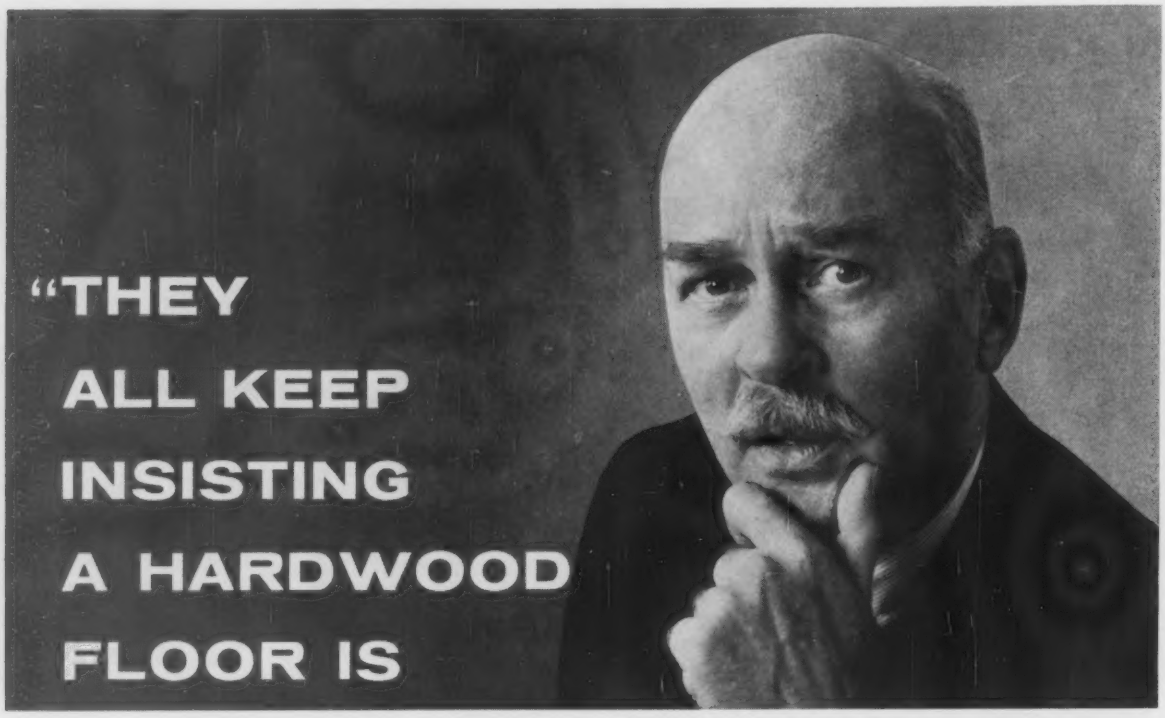

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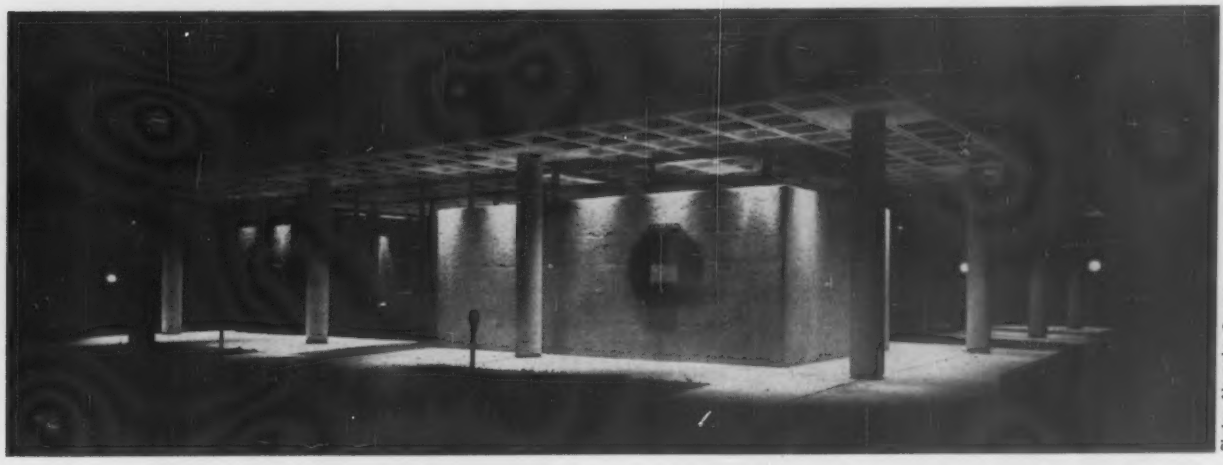


Photo: Alexandre Georges

Chase Manhattan Builds Again: A Pavilion Bank

GREAT NECK, N. Y. Chase Manhattan Bank, which only recently opened its huge office tower in the Wall Street district (by Skidmore, Owings & Merrill), has followed up with the unveiling of a neighborly new branch in Great Neck, a New York suburb.

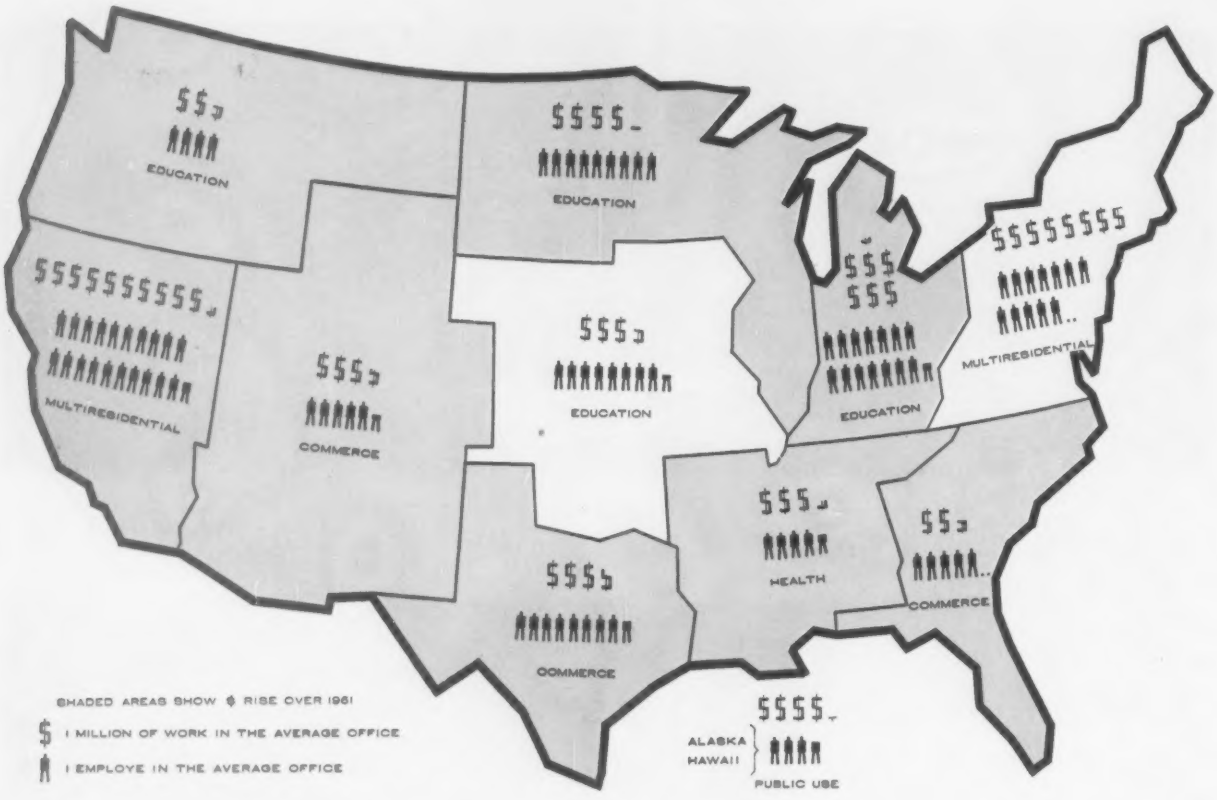
Designed by The Architects Collaborative (Benjamin Thompson, Partner-in-Charge), the branch bank is a serene pavilion set in a stand of handsome old trees. Columns and vault walls are bush-hammered, white, reinforced concrete, the columns standing out from glass walls on the two street sides of the corner structure to provide a loggia for customers and passers-by. The building is set back from the street behind a landscaped plaza. At the rear of the bank there are two drive-in tellers' booths, connected with the main building by an underground tunnel. Also at the rear is a structure housing mechanical services, thereby keeping unsightly paraphernalia off the roof.

Ceiling of the gracious main banking space is pan-construction-concrete, with plastic insets functioning as a skylight over the customer writing desk. Interior materials are muted but warm, including Welsh quarry tile for the floors, walnut and birch for the counters and furniture, and brick, glass, and concrete for the walls. Works of contemporary art are featured, as in the parent building. TAC designed and/or selected all interior appointments for the building. At the basement level, the loan office sports a jaunty multicolored rug and bent wood chairs. At this level, also, and living up to the bank's claim for community service, is a room seating up to 100 people for community activities such as meetings, art shows and flower shows.

Skylight over checking desk gives sense of spaciousness to main area.

Bright rug highlights loan office (above).

Neat conference room has Breuer chairs.



13.7% Rise in Architectural Business for 1962

Multi-Residential and Commerce Most Active

Tabulation of the 1152 returns in the largest annual business survey P/A has ever conducted has been completed, and the results show that dollar volume of work in the average office to be built next year will rise 13.7% over 1961, from an average of $5,067,353 to an average of $5,863,446. Other indications of robust health in the architecturally-designed construction market for 1962 are the facts that only two of the ten major areas of the country—the Northeast and the Central States—foresee declines in business for next year, and that, of the building categories likely to increase in the architect's office in 1962, all are basic types: Education, Multi-Residential, Single Residential, Public Use, Defense, and Recreation. Average dollar volume in particular regions is rising each year. In the 1960 forecast, one region reported less than $1 million average of foreseen business; in the 1961 forecast, the same region reported a prediction of less than $2 million; in this forecast, not one region expects an average dollar volume of less than $2,470,000.

Of the work on the boards of the nation's architects, 67.1% is for private clients and 32.9% for public clients. Most of the building categories that will rise, except for Single Residential and much Multi-Residential, are largely in the public domain: Education, Defense, Recreation, and Public Use. However, many architects comment on the rise in private commissions in their areas, indicating that this source is still the best for new business. Leading building categories in separate regions (*see chart above*) are all thriving types, two being Multi-Residential, four Education, three Commerce, one Health, and one (Alaska-Hawaii) Public Use. Also regionally, California-Nevada regains the lead average-dollar-volume position it lost to the Northeast region last year. The leap from 1961's average per office of $5,676,177 to 1962's average of $10,280,597 in this region is largely reflected in immense increases in both Multi-Residential and Single Residential categories. The Northeast region takes second place in average dollar volume per office, with an almost $8 million average on the boards for next year. The leader here also is Multi-Residential, with Commerce a close second. In the Great Lakes region, third in average dollar volume, Education, that substantial building category, leads the field. Education also leads in the Northwest, North Central and Central States, as does Commerce in the Southeast, Texas, and the Western Mountain regions. Health leads in the Gulf States, and the newest reporters, Alaska-Hawaii, indicate that the Public Use category is foremost.

Of significant interest is the indicated increase in Multi-Residential business in 1962. This category, which was third in importance at an average per office of $750,120 in the 1961 forecast, reaches top place among types of buildings with a whopping $1,256,486 average per office for the 1962 forecast. Activity in this type is up in all but three regions, and not impressively down in those. Commerce and Education continue their substantial positions in the average architect's business, accounting for 19.6% and 17.5% of his dollar volume, respectively. Buildings for Public Use occupy the same position (fourth) in

TABLE 1

Number of firms reporting and regional distribution

Region	% of Firms
Northwest	5.8
North Central	9.7
Great Lakes	9.4
Northeast	26.4
Southeast	8.5
Gulf States	5.8
Central States	7.5
Texas	5.6
Western Mountain	6.1
California-Nevada	14.9
Alaska-Hawaii	.3
Total Returns: 1152	100.0

Distribution of 1152 returns follows regional spread of past forecasts.

TABLE 2

Average dollar volume by regions

Region	Average $ Volume
Northwest	$2,471,862
North Central	4,040,765
Great Lakes	6,225,266
Northeast	7,917,833
Southeast	2,477,296
Gulf States	3,294,433
Central States	3,497,988
Texas	3,849,006
Western Mountain	3,712,957
California-Nevada	10,280,597
Alaska-Hawaii	4,035,000
National Average	$5,863,446

California-Nevada regains regional $ lead; only two regions may decline.

TABLE 3

Dollar-volume averages and % distribution of work by types of buildings in all regions

Type	% of Average Architect's Work	$ Volume in Average Office
Residential (Multiple)	21.4	$1,256,486
Commerce	19.6	1,148,378
Education	17.5	1,027,108
Public Use	10.1	590,034
Residential (Private)	8.0	466,065
Health	6.3	370,520
Industry	5.6	326,889
Religion	4.3	249,137
Defense	2.9	170,911
Recreation	2.3	137,117
Urban Design	.7	43,321
Other	1.3	77,977
Total (average office, all regions)	100.0	$5,863,446

Multi-Residential will be important in 1962; also Commerce and Education.

TABLE 4

Activity of architectural firms in types of buildings

Types of Buildings	% Architects Reporting Current Work
Commerce	16.2
Education	15.4
Residential (Single)	13.4
Religion	12.8
Residential (Multiple)	10.3
Public Use	8.4
Health	7.9
Industry	6.7
Recreation	4.9
Urban Design	1.2
Other	1.1

Table indicates general nature of most practices; Commerce leads.

TABLE 5

Specialization of architectural firms

Types of Buildings	%of Firms Doing Only This Type
Education	3.8
Commerce	3.1
Residential (Private)	2.2
Religion	1.6
Residential (Multiple)	1.5
Industry	.8
Health	.7
Public Use	.6
Recreation	.5
Defense	.08
Total	14.78

Specialization has increased by 4%; Defense and Recreation are new here.

TABLE 6

Sizes of architectural firms

Size of Firm by Number	% of National Total
Up to 4 employees	38.5
4-9 employees	25.7
10-19 employees	9.7
20-39 employees	5.1
40-100 employees	2.2
Over 100 employees	1.2

(Total percentage is less than 100% since some respondents did not give number of employees.)

Size of Firm by $ Volume of Work on Boards	% of National Total
Under $1 million	39.6
$1-10 million	49.4
$10-50 million	9.4
Over $50 million	1.6
	100.0

By far most firms are small to medium-sized, account for up to $10 million.

the hierarchy, with almost the same percentage of the architect's business (10.1%) as in the 1961 forecast. Single Residential is next, with a healthy increase over the last forecast (a big year for residential construction of all kinds, it would seem). Health, Industry, Religion, Defense, and Recreation will account for another 21.4% of business. Urban Design, with only 0.3% of the average architect's business, would seem a disappointing category after recent emphasis on this topic, such as at the Philadelphia AIA Convention; but considering that the average dollar volume for this comparatively new type is $43,321, and that most communities have not even started badly needed renewal plans, one can see a bright future for Urban Design past 1962.

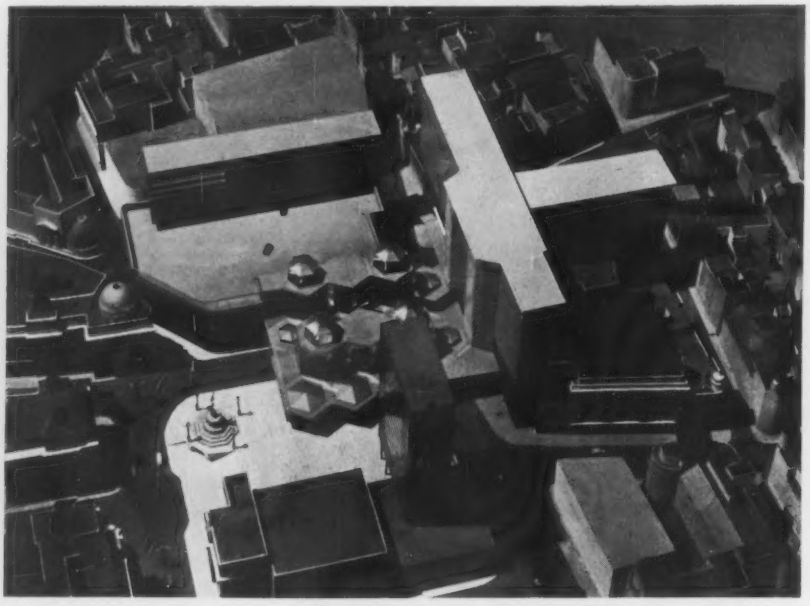
The usual healthy percentage of jobs in preliminary design and in working drawings prevails as in previous forecasts. Some 53.6% of the reported work is in preliminary design, to be built later on in 1962. The rest of the work —46.4%—is in working drawings and consequently scheduled for more immediate construction.

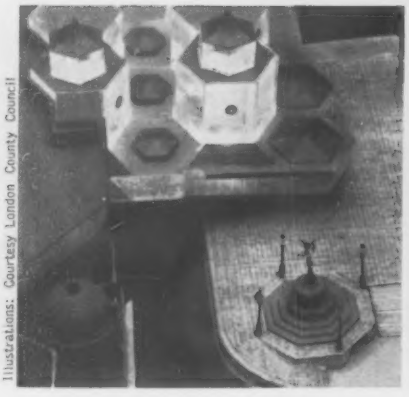
Specialization seems to have increased since the last forecast; a total of 14.78% of firms reportedly concentrating on one category of building.

The greatest bulk of architectural offices in 1962 will, of course, be those numbering up to nine employees and doing up to $10 million in work. The average office has a staff of 10.9 men and has business for 1962 amounting to $5,863,446 *(see tables)*.

Architects reporting in P/A's forecast feel that by far the most likely factor to influence practice for good or bad in 1962 will be the international situation, with its possibilities of war, increased defense spending, and restrictions on materials. Economics and Government spending, availability of money, and the cost and availability of construction materials and labor also loom large in the architect's thoughts of the future. Factors expected to influence design include, most especially, advances in concrete technology, followed by rise of new materials (notably plastics) and methods, and modular and factory-built components. There seems to be a draw between the tendency toward "sensual" design and what one respondent called "more disciplined creativity."

P/A's prediction for 1962: Despite a distressing international picture at the moment, architects are busy throughout the country, and prospects are bright for one of the finest years in memory.





Illustrations: Courtesy London County Council

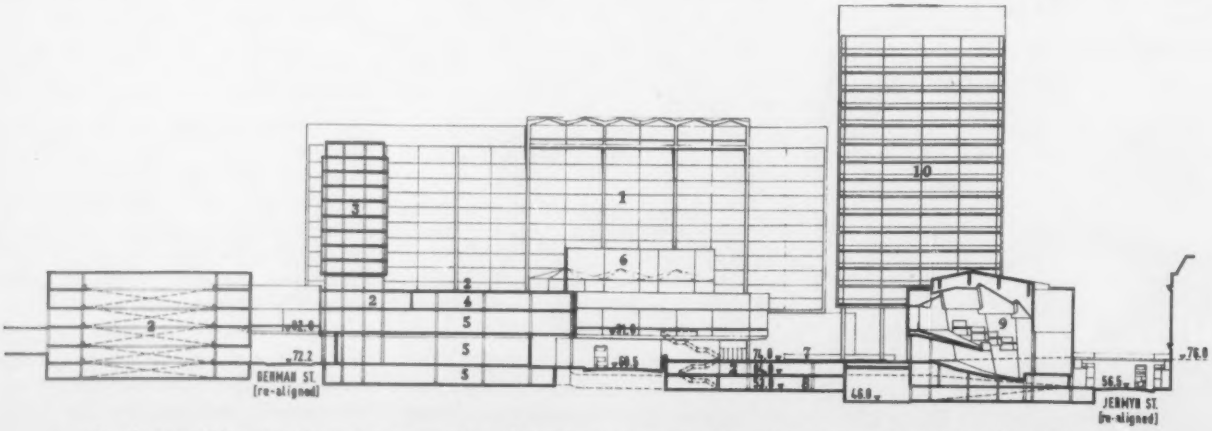
ARCHITECT'S PROPOSAL FOR PICCADILLY

Design Preserves Gaiety, Creates Open Plaza

LONDON, ENGLAND Following the uproar caused by a developer's proposal to erect in Piccadilly Circus a high-rise building which would act as a huge easel for illuminated signs (p. 54, JANUARY 1960 P/A), the noted British architect Sir William Holford got busy devising a plan for the area to be submitted to the London County Council, arbiter of planning and design in the metropolitan area. Following the presentation of the plan to LCC, Sir William was authorized to discuss his ideas with owners and developers of property around the Circus.

Holford's proposal has the twin advantages of opening up the Piccadilly area with a generous pedestrian plaza (it is presently worth your life to try and reach the Eros statue across London's swarming traffic), and making allowance for the advertising displays which give the section much of its night-time color.

The proposed advertising signs would be atop an office building on the Monico site (whilom scene of the unlamented project which started the whole affair), but would not rise higher than the parapet of the County Fire Office, located where Regent Street enters the Circus. The signs, interspersed with decorative lighting, would be mounted on a treillage over cafés and restaurants at the top deck of the building. A large hotel would span the street behind the gaily roofed deck (*above*). This structure, like most of the new buildings in the proposal, would be open to pedestrian traffic at the plaza level. To the right of the Eros statue (actually named the Shaftsbury Monument), there would remain an existing building containing two noted stores. Linked to this would be the new Criterion Theater, some shops, and a tower building containing offices and apartments. The entire main plaza would be raised seven feet above street level. Instead of the Cockney flower sellers who traditionally set up shop on the base of the monument (joined, frequently, by ladies of another occupation), there would be flower shops beneath the monument at street level. Another feature of the plaza would be a large reflecting pool near the new office tower. Car parking would be provided atop the Monico shops, reached via a ramp from the street at the rear. A pedestrian bridge over Jermyn Street behind the Criterion Theater would permit access to the plaza.



1 *hotel*, 2 *parking*, 3 *offices*, 4 *restaurant*, 5 *shopping*, 6 *signs*, 7 *plaza*, 8 *concourse*, 9 *theater*, 10 *"tower block"*

PERSONALITIES

On assuming his new duties at Rice University this fall, **William W. Caudill** announced to the assembled students and faculty that he would deliver his commencement address.

After all, he noted, "Commencement means beginning. As the new chairman of the Department of Architecture at Rice University, I am a commencer." Actually, he is no more a beginner than Sugar Ray Robinson was the latest time he stepped into the ring, having been a faculty member or visiting critic at Texas A & M, Princeton, Cornell, Washington University, North Carolina State, Harvard, and Delhi University. Principal of Caudill, Rowlett & Scott, with offices in Houston, Oklahoma City, and Stamford, Connecticut, Bill Caudill is adept not only at teaching, but also—as most architects know—at designing schools. He is past chairman of AIA's National School Committee and member of the National Council on Schoolhouse Construction and the Adult Educational Association of the U.S. His firm has designed about 250 schools of all types, many of them award winners, and he is author of two books, a research booklet, and a film on school design and planning. He is a strong believer in the continuity of architectural learning. "Though you may have decided to take architecture only recently," he told his Rice audience, "you have been preparing yourselves to be architects from the day you first made designs in your pablum. . . . The education of an architect is endless. It started long before you came to Rice and will continue long after you leave." Echoing Neutra's phrase, "survival through design," he exclaimed, "How wonderful to have our world designed for people to live free from filth and poverty and free from fear. . . . The scope of design is as broad as the world . . . and . . . design is the business of the architect." Citing mainly broad aims as he took charge of the department, Caudill said that his wish is "to *teach architecture*, to *create concepts* conducive to better architecture, to the *application of these concepts* by practitioners, and to produce more *creative architects*."

RICHARD L. AECK, Atlanta, returns early this month from a trip to Cambodia, where he worked with the International Co-operation Administration to co-ordinate the space needs and site plan for a campus development for an agricultural college there . . . Washington University School of Architecture has as visiting lecturer this fall the Dutch architect ALDO E. VAN EYCK . . . ELMER A. LUNDBERG, Director of Architectural Services for Pittsburgh Plate Glass, was re-elected President of The Producers' Council . . . ISADORE and ZACHARY ROSENFIELD have been appointed consultants in hospital planning to the U.S. Air Force for the third consecutive year; they also have been named—for the second time—observers for UIA at the Washington meetings of the Pan American Health Organization . . .

The little black box you see here in the hands of **Robert B. Newman** accompanies him on all trips to indulge in what he describes as "one of my favorite sports—lecturing." The box

is a sound machine, and the reason Newman carries it is because he is one of the principals of Bolt, Beranek & Newman, Inc., the noted acoustics consultants. China-born Newman was ideally equipped by his education to work with architects on acoustics matters. He possesses a B.A. and M.A. in physics from the University of Texas and a M.Arch. from MIT, where he now teaches (in addition to lecturing all over the place). Newman bemoans the architect who thinks that the only time acoustics advice is needed is when he is designing an auditorium, concert hall, or church. "Every building project," he says, "has in it some acoustics problems, and . . . in almost every case, attention to these problems, either through professional consultation or through the architect's own understanding of the basic principles involved, results in a better building." Anyone who has been in a recently completed apartment or hotel room with their acoustically transparent partitions (not to dignify them with the name of walls) cannot but agree with this opinion. The architect *must* have a better knowledge of acoustics, Newman believes, and that is the point of all his "missionary" activity such as lecturing and acting as guest editor (aided by Bill Cavanaugh of his firm) of the May 1959 acoustics issue of PROGRESSIVE ARCHITECTURE. When this knowledge exists, the ideal relationship between architect and consultant is possible, he says. "Never must the engineer be in a position of imposing his will on the architect. Rather, it must be a true collaboration, founded on mutual respect and understanding."

WILLIAM SCHUMAN, president of the Juilliard School of Music, was elected president of Lincoln Center for the Performing Arts . . . Dr. A. ALLAN BATES is now director of University Valley, New York University's research and educational center in Sterling Forest, N.Y.; he was vice-president for research and development for Portland Cement Association . . . Recipient of first grant under newly founded James Stewardson Traveling Fellowship of New York Chapter AIA is EDWARD T. SCHIFFER . . . CARL S. MEYER, who received his Bachelor of Architecture degree from University of Virginia, is now architectural consultant for Allied Chemical's Barrett Division . . . ALAN B. GLASS of Oklahoma State University and SIDNEY BARRETT of Georgia Tech were the winners of the 1961 Lloyd Warren Fellowships, Paris Prize in Architecture, from National Institute for Architectural Education . . . Dr. WALTER GROPIUS was the first architect to receive the Goethe Prize in Frankfurt; previous recipients have been Freud, Schweitzer, Mann, and Hauptmann.

Sketches by Romano Cobelletti

School Notes

University of Miami School of Engineering has inaugurated a five-year program leading to the Bachelor of Architecture degree. Head of the program is Architect James E. Branch. . . . Five degrees are currently being offered by Columbia University School of Architecture, according to Dean Charles R. Colbert. They are: Bachelor of Architecture, Bachelor of Planning, Master of Science in Architecture, Master of Science in Planning, and Ph.D.'s in both Architecture and Planning. California Architect Ernest J. Kump is a professor on the staff this year. Specialized programs being offered are: Hospitals and Public Health Facilities, Design and Planning of Educational Facilities, and Central Business District Planning and Design. . . . University of Wisconsin Extension is running two programs of interest to architects. First, November 30 to December 1, is an Engineering Institute of Paints; second is a Conference on Soil Mechanics and Foundations, December 14-15.

Sheer Masonry Tower for Detroit Bank

Construction will start this fall on a 26-story tower for the Detroit Bank and Trust Company in the heart of the city's financial district. It will rise on Fort Street, sharing the block between Shelby and Washington Streets with a four-story building which now houses the bank's main trust office. Plans are to move the bank's main office into the old building and connect the two structures by a three-story link so that the combined street-level areas will form a lobby and main banking floor. The old

building will be extensively modernized to adapt to these changes. The bank will occupy the first ten floors of the building. Precast quartz aggregate panels will form the façade of the tower, which will be set back from the street on two sides to provide landscaped open space. Completion is expected by mid-1963. Architects and Engineers: Harley, Ellington, Cowin & Stirton, Inc.; Consulting Architects: Emery Roth & Sons.

Moses Sees the Pharoah; Heliport and Better Living

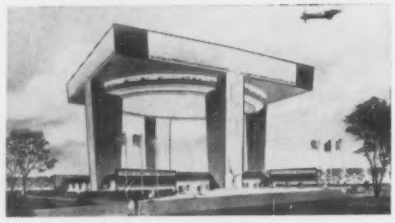
(World's Fair Follies, Cont'd.)

In case you have been holding your breath since reading in last month's P/A NEWS REPORT that Bob Moses may get neither Federal money *nor* a Federal exhibit at his forthcoming tribute to the design and planning of the 1930's (i.e., the 1964–65 New York World's Fair,) exhale and rest easy. After the bill to provide $300,000 for study of Federal participation in the extravaganza was blocked in the Senate Foreign Relations Committee, Moses sought and gained a personal audience with President Kennedy (who had nothing else to think about at the time but Berlin and a few other details); New York Mayor Robert Wagner supplicated Presidential intervention in a letter; and, when the smoke cleared, the President had promised to support the measure when Congress next convenes.

Meanwhile, the Fair issued another of its glossy reports on doings at Flushing Meadow. It showed that, of the more than 50 countries and international organizations invited to exhibit, only 12 had selected a site, and none had signed leases. Of the 49 companies and industries listed in the brochure as possible exhibitors, 15 had signed leases.

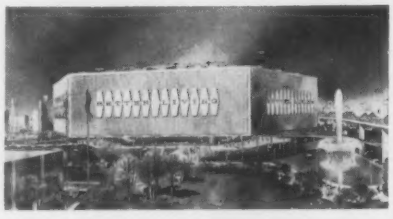
Word was released about the same time on two projects for the Fair, neither of which is likely to become the *Tour Eiffel* of the future (one even lacked architectural credits).

First we have the Port of New York-New Jersey Exhibit, to be built by the Port of New York Authority. It will: (1) have a 120-ft-high heliport; (2) contain the "official World's Fair restaurant"; (3) be supported by



four tapering columns containing the elevators; (4) be the "Air Gateway" to the Fair. This is the one significantly lacking proper credentials.

Then there is the Better Living Building, commissioned by Edward H. Burdick Associates, Inc., an exhibition



management firm, as a rental exhibition building for the showing of foods and beverages, sports gear, the fruits of music and art and publishing, toys, hobbies, home building, travel, and so on. Better living, it seems, covers a lot of ground (except architecture?). The hexagonal building will have three floors for all this activity, and will overlook a triangular pool at a corner of the site. Exhibitors tired of better living will have a private club for their own use on the roof of the structure. This one has an architect: John Lo Pinto & Associates of New York.

Aluminum and Plastic Shell House for $3000

A low-cost shell house has been designed using aluminum and rigid polyurethane foam as structural materials and held together by epoxy adhesive. The walls are made of sandwich panels with a core of polyurethane foam covered on the exterior with laminated aluminum, "stucco"-textured and painted, and on the interior with phenolic hardboard. The roof is a sandwich of 2″ polyurethane foam between two layers of fiberglass. It is supported by hollow fiberglass beams that are held up by extruded aluminum posts. No nails, screws, or bolts are used in the house, which is joined member to member

Continued on page 66

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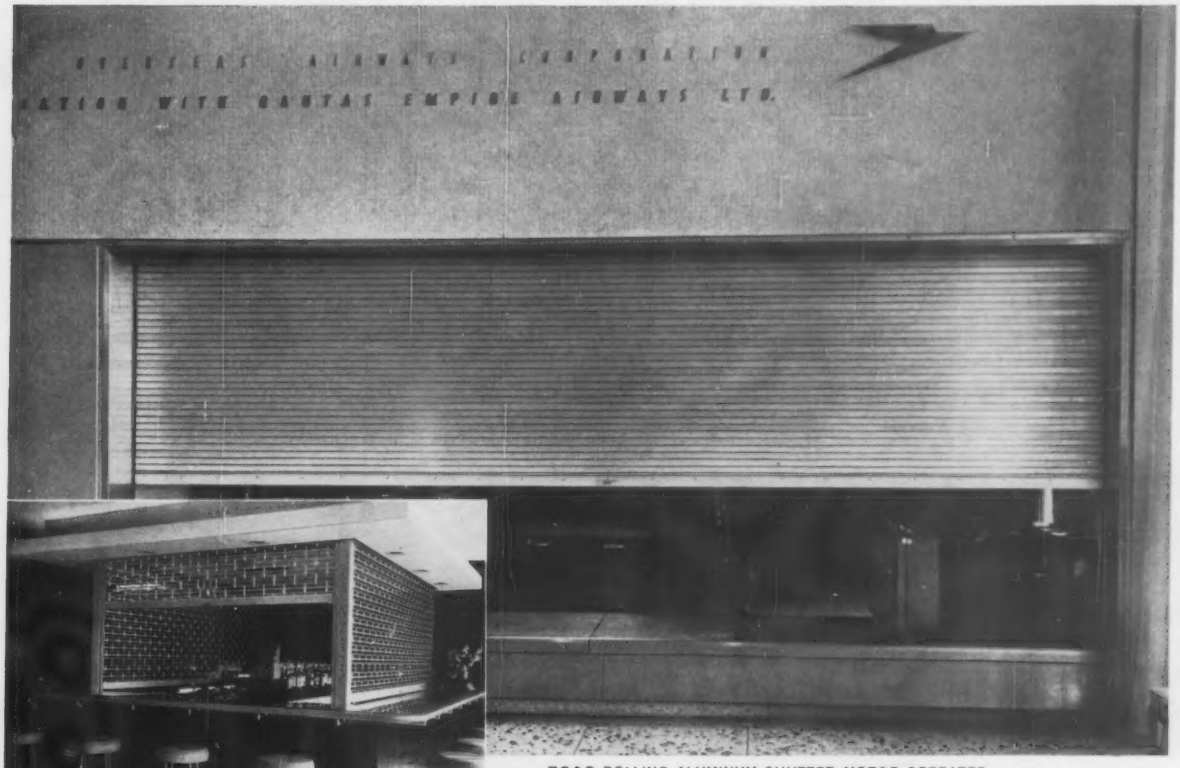

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STEEL, ALUMINUM, STAINLESS, BRONZE

KLM ROLLING ALUMINUM GRILLE, BUTTERFLY DESIGN

BOAC ROLLING ALUMINUM GRILLE, BUTTERFLY DESIGN

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FOR A NEW AIR-CONDITIONED HIGH SCHOOL: $13,950 SAVING ON EQUIPMENT; $1,836 FORECAST SAVINGS IN YEARLY OPERATING COSTS

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Cost of Heating & Cooling Equipment	
Original Specifications	$20,700
Dividend Engineering Specifications	$ 6,750
Predicted Savings	$13,950
Additional Glass & Insulation Cost (in place)	$ 8,640
Net Initial Savings	$ 5,310
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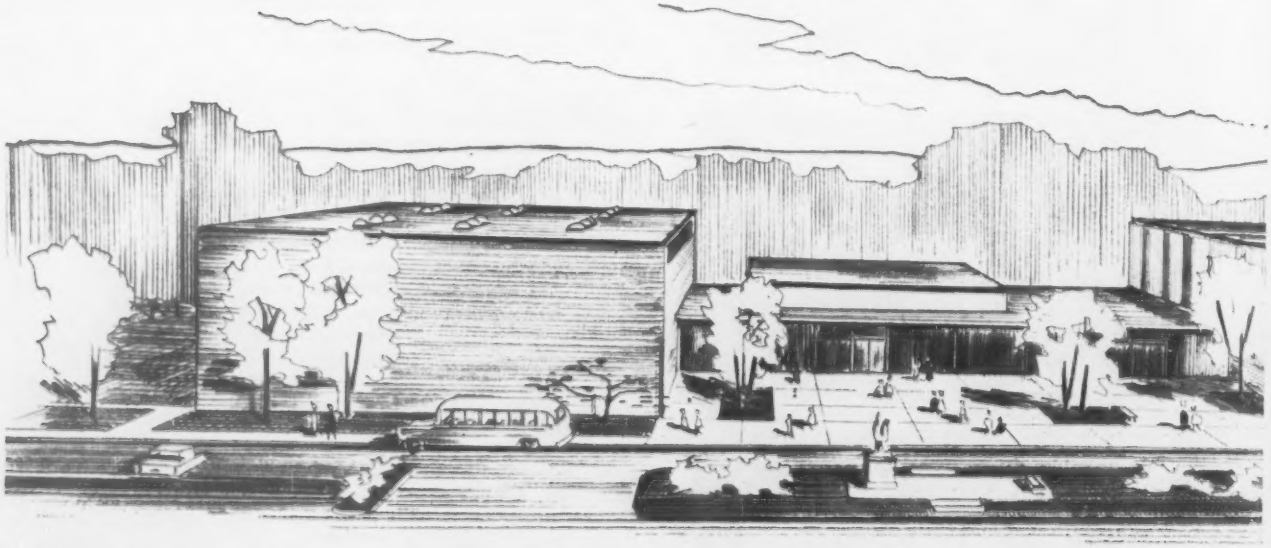
Original Specifications	$16,301
Dividend Engineering Specifications	$14,465
Annual Savings	$ 1,836



MAPLE PARK JUNIOR HIGH SCHOOL, North Kansas City School District, Kansas City, Mo., Dr. Ruie B. Doolin, Superintendent
Architects: Kivett & Myers & McCallum. Mechanical Engineer: W. L. Cassell.

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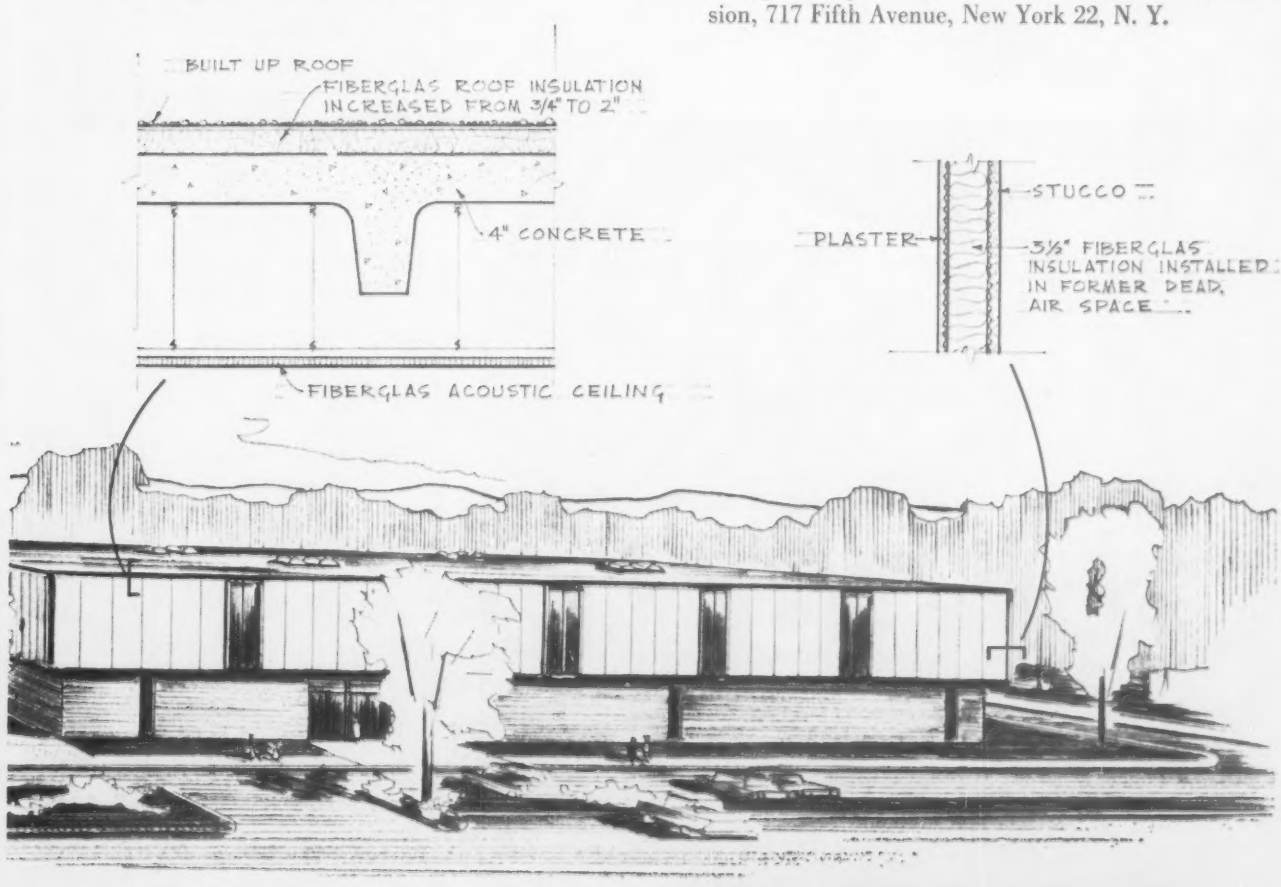

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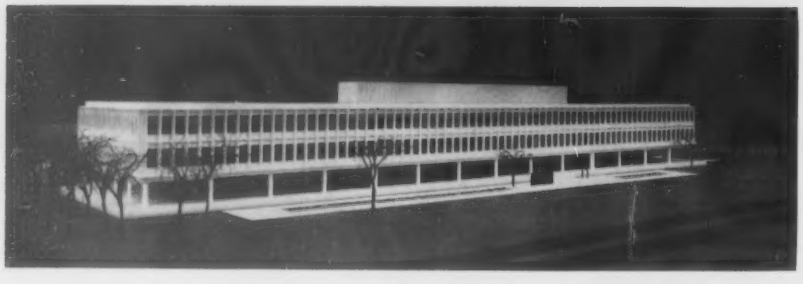
Formal Design for Vermont's Groves of Academe

Architect Roland M. Whittier's design for the library of the University of Vermont shows a formal building posessing a temple-like atmosphere appropriate to its use. Rising from a low course of stone, the façade will be brick, with a large panel of matched-grain marble surrounding the entrance. Separated visually from the building by a band of translucent plastic, the roof will appear to hover over it. Whittier notes that his office uses the modular dimensioning system. "We have used this system for years and will continue to use it. It has worked very well for us."



Crisp Design for Ontario Oil Operation

For the Ontario regional headquarters of Canada's Imperial Oil, Ltd., John B. Parkin Associates of Don Mills, Toronto, has designed a classical white temple to business. First floor of the three-story building will have an open colonnade, to give lightness to the upper floors. Exterior will be white, precast concrete panels with an aggregate of quartz chips. Ground floor will accommodate cafeteria and kitchen, health center, and mail department, while the second and third floors will hold sales, administrative, and management offices and the electronic accounting department. The 100′ x 350′ building will be surrounded by a landscaped site with parking for 300 cars.

Continued from page 62

with epoxy adhesive. The hollow beams can be used as ducts for utilities, or heating and air conditioning. Architect: Charles F. Wise; Chemical Engineer: Max C. Weiner; Builder: Major Realty Corp.

High Rise for San Diego

Eighteen-story home office building for the Home Federal Savings and Loan Association in San Diego will feature a fireproofed steel frame with solar gray glass and anodized aluminum spandrel curtain wall on a 4′-7″ module. The tower, which will be used in connection with an existing, adjacent building, will continue, along its main street façade, the travertine facing of the older structure. The other entrance will have a 50-ft-wide by 32-ft deep entrance court extending upward for two floors. Architect: Frank L. Hope & Associates.

AWARDS, COMPETITIONS

National competition has been announced for the design of Boston's new City Hall. Program and entry forms may be obtained from Lawrence B. Anderson, Government Center Commission of the City of Boston, 1 Church St., Boston, Mass. Preliminary stage closes on January 17, 1962. Judges for this stage are Architects Pietro Belluschi, Walter A. Netsch, Ralph Rapson, and William W. Wurster; and Harold Hodgkinson, Chairman of the Board, Wm. Filene's Sons. Jury for the final stage will consist of these men plus

Continued on page 70

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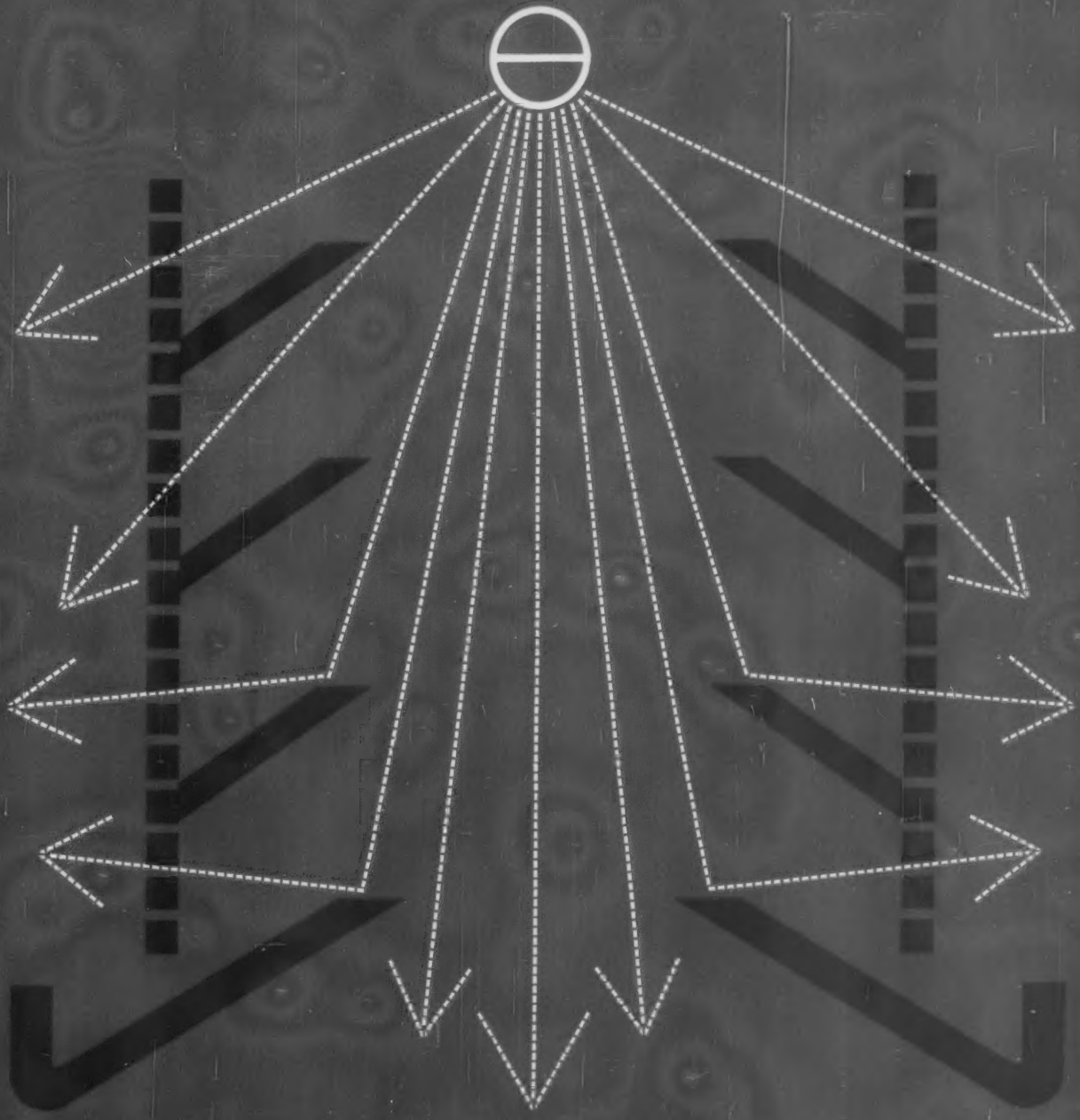

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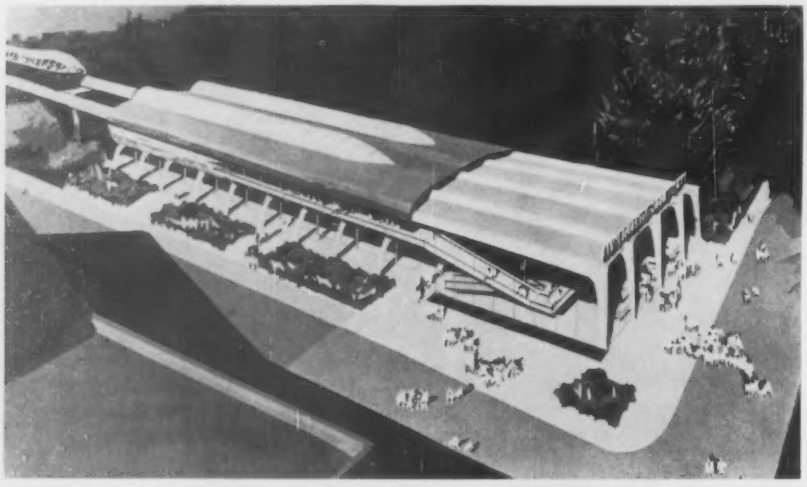
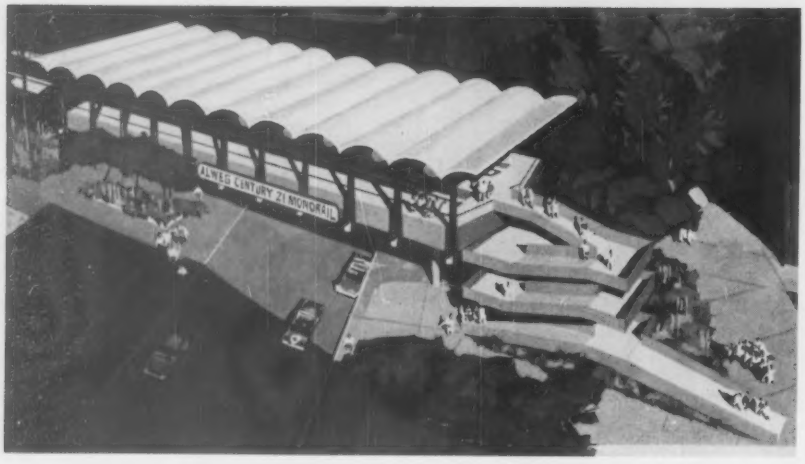
Continued from page 66

O. Kelley Anderson, President of New England Mutual Life Insurance Company, and Sidney R. Rabb, Chairman of the Board, Stop & Shop, Inc. . . . Deadline for nominations for the 1962 annual $25,000 R. S. Reynolds Memorial Award is December 18. Architect may be nominated by anyone, including himself. Besides the handsome honorarium, the winner receives an original sculpture by a noted sculptor. . . . Schools have already received notification of the second Reynolds Aluminum Prize for Architectural Students. Preliminary winners from individual schools must be received at the Octagon by January 9, 1962, where they will be judged on January 10-11. . . . Time schedule for AIA's *own* 1962 Honor Awards Program is: entry slips and fee deadline, November 28; deadline for receipt of submissions in brochure form, January 19, 1962; judgment, January 29-31. . . . Deadline for applying for $5000 Arnold W. Brunner Scholarship of New York Chapter AIA is January 15, 1962. Address is: 115 East 40 St., New York 16. . . . Entries for annual awards program of Copper & Brass Research Association, whose winner gets $500 and a bronze trophy, must be submitted no later than March 31, 1962. Forms are available from the association, 420 Lexington Ave., New York 17. . . . Jury for competition to select "Outstanding Civil Engineering Achievement of the Year" for American Society of Civil Engineers will meet early in 1962. Details from ASCE, 345 East 47 St., New York 17.

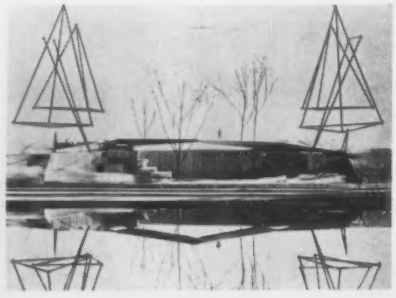




Monorail Stations for Century 21

Currently under construction in Seattle are two monorail terminal-stations for next year's Century 21 international exposition. The monorail system will zip visitors from downtown Seattle, where there will be a station with a barrel-vault roof, to the terminal-station at the center of the fair in 98 seconds. Vaulted plastic roof forms will cover the tracks at the exposition end. Both stations will be supported on reinforced concrete piers. Architect is Adrian Wilson & Associates, Los Angeles.

On the East Coast, the New York World's Fair bosses have signed with the Greyhound Bus Company to provide transportation at the gallimaufry. Same people they used at the 1939 Fair, of course.



Tony Armstrong-Jones Designs for the Birds

Antony Armstrong-Jones, husband of Princess Margaret, was one of the three designers of an aviary for exotic birds to be built at the London Zoo. The 80-ft-high structure will have triangular opening at each end covered with wire curtains through which visitors will pass to an elevated walkway. It will reflect in the waters of the Regent's Canal, on which it will be situated. Cedric Price and Frank Newby were co-designers.

De Ville de Luxe for Downtown St. Louis

Newly revised building codes will permit the construction of the new St. Louis de Ville, a luxury hotel, in downtown St. Louis. Architect is Colbert-Lowrey-Hess-Boudreaux of New Orleans, who performed same service for the Crescent City's Motel de Ville. (Partner Colbert is Dean of the School of Architecture at Columbia Univer-

Continued on page 74

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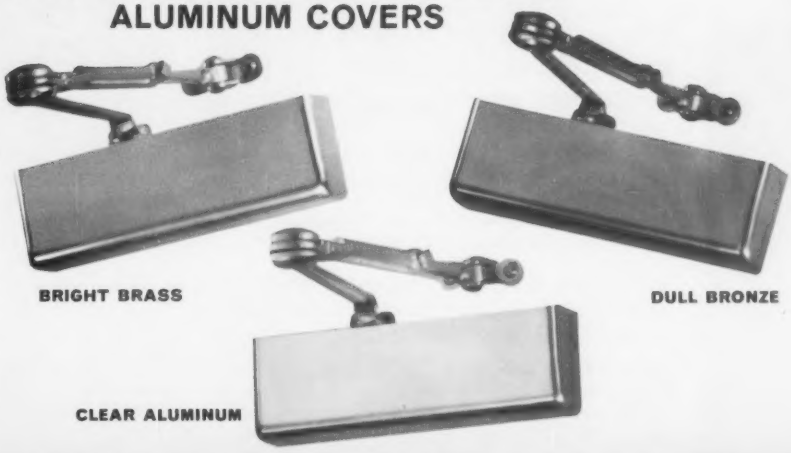
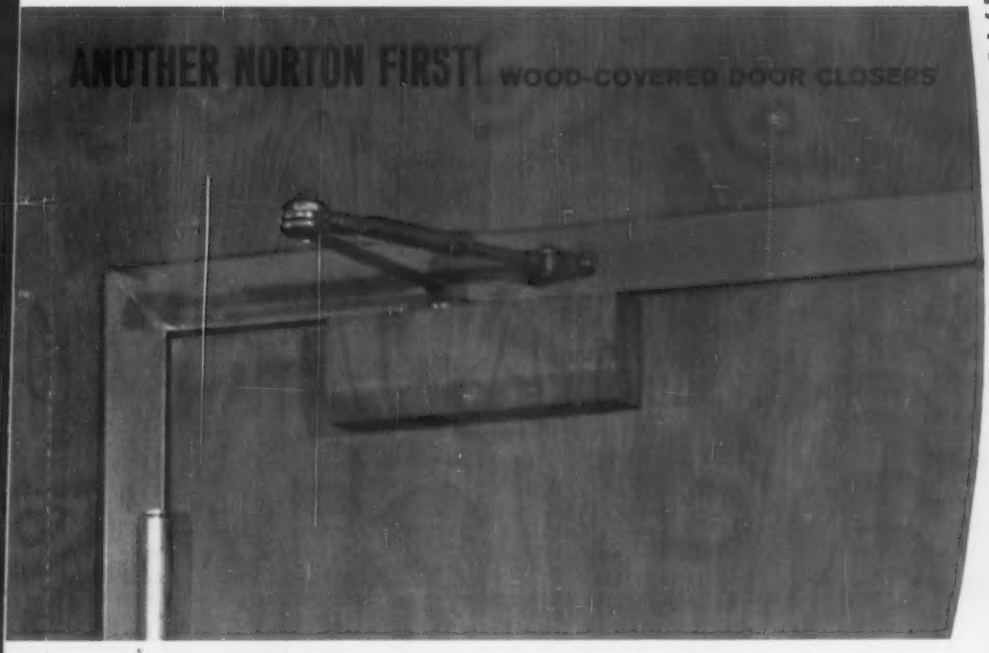
NEW FROM NORTON!

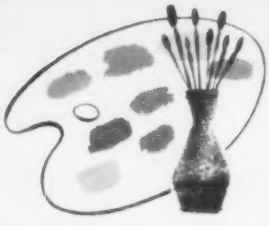
DOOR CLOSERS WITH ANODIZED ALUMINUM COVERS





WOOD COVERS IN STOCK

PAINTED COVERS



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Match or contrast the doors, hardware, walls, panelling or color in your next building. You have the choice with Norton's Series 7000 closers. Anodized aluminum covers to match door hardware. Wood covers to match the wood of doors and room panelling. Primed metal covers to be painted to match or contrast with room decor.

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Norton's 7000W closer covered with cherry wood to match the wood of door and room. This is at Christ Community Hospital, Oak Lawn, Illinois. Architect: Burnham & Hammond.

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TO MATCH DOOR HARDWARE: Series 7000's newest style feature is anodized aluminum covers to match door hardware. Available in bright brass, dull bronze and clear aluminum.

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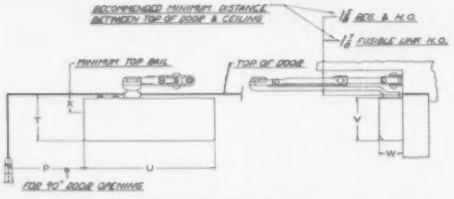
Successful bidder is requested to have a factory representative inspect and properly adjust each closer at completion of job. Closer to be Norton Series 7000 (7000W, 7000A), P-7000 (P-7000W, P-7000A), or equivalent.


RECOMMENDED MINIMUM DISTANCE BETWEEN TOP OF DOOR & CEILING
⅛" BOS. & H.O.
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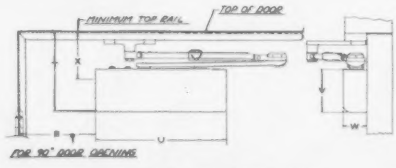
MINIMUM TOP RAIL
TOP OF DOOR
FOR 90° DOOR OPENING



SERIES No. 7000 REGULAR ARM*

MAX. DOOR SIZE WOOD OR METAL			CATALOG NUMBER OF CLOSER RECOMMENDED*			P	T	U	V	W	X	APPROX. SHIPPING WEIGHT (LBS.)
INTERIOR	EXTERIOR											
	IN-SWING	OUT-SWING	REGULAR ARM	90° TO 180° REG. H.A.	90° TO 135° REG. F.L.H.A.							
2'-6"			7002	7002-H	7002-FL	6¼	3	8⅛	2¼	1⅛	1	6
3'-0"			7003	7003-H	7003-FL	6¼	3	8⅛	2¼	1⅛	1	6
3'-6"	2'-2"	2'-6"	7003-M	7003-MH	7003-MFL	6¼	3 11/16	13⅜	3¼	1 15/16	1¼	8
4'-0"	2'-8"	3'-0"	7004	7004-H	7004-FL	6¼	3 11/16	13⅜	3¼	1 15/16	1¼	8½
4'-6"	3'-2"	3'-6"	7005	7005-H	7005-FL	6¼	3 11/16	13⅜	3¼	1 15/16	1¼	8½

SERIES No. P-7000 PARALLEL ARM*

MAX. DOOR SIZE WOOD OR METAL		CATALOG NUMBER OF CLOSER RECOMMENDED*			P	T	U	V	W	X	APPROX. SHIPPING WEIGHT (LBS.)
INTERIOR	EXTERIOR										
	OUT-SWING	PARALLEL ARM	90° TO 180° PAR. H.A.	90° TO 180° PAR. F.L.H.A.							
2'-6"		P-7002	P-7002-H	P-7002-FL	7¼	5⅛	8⅛	2¼	1⅛	3	6
2'-8"		P-7003	P-7003-H	P-7003-FL	7¼	5⅛	8⅛	2¼	1⅛	3	6
3'-0"	2'-4"	P-7003-M	P-7003-MH	P-7003-MFL	5¼	5⅛	13⅜	3¼	1 15/16	3¼	8
3'-6"	2'-8"	P-7004	P-7004-H	P-7004-FL	5¼	5⅛	13⅜	3¼	1 15/16	3¼	8½
4'-0"	3'-0"	P-7005	P-7005-H	P-7005-FL	5¼	5⅛	13⅜	3⅜	1 15/16	3¼	8½

*Add suffix "W" for wood covers and suffix "A" for anodized covers.

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Manual W 2

Tear out along perforation

Tear out along Perforation

New Appropriations Benefit Construction

by E. E. Halmos, Jr.

The effect of the largest peacetime appropriations in history probably will be the most important single result of the first session of the 87th Congress.

More than half of the total of $93 billion appropriated by the lawmakers was specifically tagged for defense. But there's little doubt that it will generate new construction work of all types as new plants are added to back the national defense effort.

It should provide a welcome boost for the private sector of the construction economy, where planning by private industry has been slowing down somewhat over the past several weeks.

Earmarked for construction only was a little over $7 billion of the total Federal appropriations—just about what was predicted in P/A when the session started.

Biggest share of that money (nearly $5 billion) is in general public works —rivers, harbors, flood control, and irrigation—and for military construction ($1.2 billion).

The rest divides into areas of interest to architects: $150 million (over two years) for airport aid; $213 million for the General Services Administration for public buildings; $76 million for Veterans' hospital construction; $195 million for Atomic Energy Commission construction; $13.5 million for urban planning grants; and $35 million for senior citizens' housing loans.

The appropriation figures take no account of new loan authority and funds assigned to the Housing and Home Finance Agency for planning advances and loan and grant programs, the $200 million for the Urban Renewal Administration under the new housing bill, and the nearly $3 billion that will flow into the national highway program from the separately financed Highway Trust Fund.

Tight Fists on Capitol Hill

Over-all, Congress produced few surprises—except possibly the greater-than-expected strength of its conservative bloc—and made almost no vital changes in existing laws.

It refused most proposals for what's been termed "back door" spending (direct draw on the Treasury without Congressional action) in such measures as the foreign aid, airport, and public works bills; blocked what it considered a "public power" push for a $95-million steam generator at AEC's Hanford works, but permitted (under some limitation) public construction of power lines for the Upper Colorado project; made some relatively minor changes (as far as construction is concerned) in labor's pay scales.

Real shocker was the complete loss of almost all school construction proposals—and much of that could be laid to bad generalship, plus deeper underlying issues.

As far as professionals were concerned, the Congressional session produced almost nothing.

Left for consideration next year were such things as tax relief for self-employed persons, upgrading of technical employees of the Government, a raise in per diem pay for consultants, establishment of a Department of Urban Affairs, and several others.

Short Shrift for Pros

There were some disturbing developments, too, even though architects were left out of them by name.

These were the continuing disclosures of irregularities (to say the least) in the highway and defense programs, which began to invlove professional people—or at least people with professional titles—as they went along.

The general atmosphere was one of increasing suspicion of professionals and it was evidenced (among other things) by the hiring by the Bureau of Public Roads of a five-man investigating corps (all ex-FBI or Treasury agents) to check into the highway program.

Coupled with the continuing lack of understanding of the professional attitude against bidding, for instance these developments promised a continuing rough time in the next session.

Planning Proponents

The over-all problem of city planning, both in the capital and elsewhere, began to occupy more attention with Congress out of town.

In Washington itself—a city already in the midst of a major office, hotel, and Government building boom —the National Capital Planning Commission was studying a proposal to "honeycomb" the city with Federal buildings, rather than concentrate these structures in the central area.

And Washington figures had something to say about general planning: New Jersey's Senator Harrison A. Williams told a local conference that the "look-alike house on the 60 foot lot" was the principal cause of the present-day urban sprawl and its attendant problems. (Williams was a supporter of moves to provide Federal money for the purchase of "open space" lands to separate built-up areas around urban areas.)

The Senator's comment was backed up strongly by a study released by the Urban Land Institute, which found that most residential zoning ordinances in the U.S. are "based on a false premise."

FINANCIAL

The promised inflow of new Federal money for construction work will be a welcome addition to a construction economy that is running strong—but not at full capacity.

Most indicators continued to show uptrends: housing, for instance, was up by about 2000 units (to 129,200 starts) in August, but indicated a slight slowing in the rate of increase.

However, the housing market was stronger than it looked on the basis of "new starts": FHA said the annual rate of applications on new homes rose in August for the fourth consecutive month, and secondary mortage market prices on FHA new home mortgages dropped 0.1 of a point in the same month, indicating further easing of money markets.

Business investment in new plant and equipment was at a cyclical low (of $33.5 billion) in the second quarter of the current year, though businessmen expected the rate to rise in the last two quarters.

P/A's own indicators showed a steady trend: Electric utilties reported plans for $630 million's worth of work (extending into 1964); gas utilities reported $111.6 million of construction plans for the remainder of 1961.

And the Investment Bankers Association reported that bond elections for a total of $1.7 billion of construction money were scheduled to be held between October 1961 and November 1962. Biggest share of these was to finance water, sewer, and other municipal utility construction; next biggest was for port and airport work.

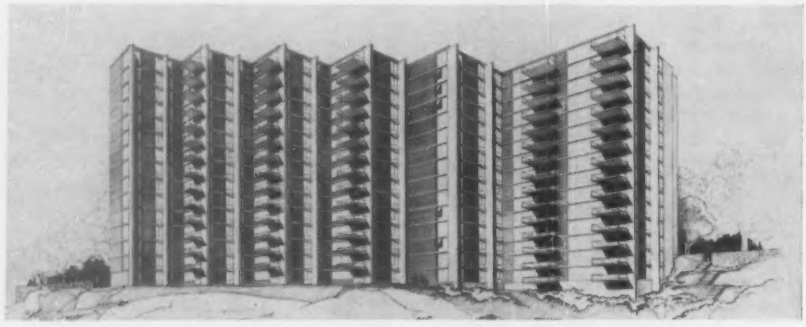
Continued from page 70

sity.) The reinforced concrete structure will be sheathed in precast concrete panels having an aggregate of multicolored quartz crystals. The project will contain 226 rooms, with provisions for 233 cars. The structure will be built in an E-shape, facing a main boulevard. A swimming pool and ice-skating rink will be in courts situated one level below the street for privacy; the rink will become a reflecting pool in warm weather, accommodating a portable cocktail island reached by a bridge. Portions of the hotel will be six stories high, with the lower three levels reserved for parking. Structural Engineer: Ogle-Rosenbohm & Associates; Mechanical and Electrical Engineer: DeLaureal & Associates.

New Way to Keep Money in Circulation

A portable bank for use in the event of disasters such as fire and storm that render standard banking facilities inoperable (in which case the portable unit could be rushed to the scene and hastily erected) has been devised by

Industrial Designer Henry Dreyfuss. The L-shaped structure, which is 30′ x 30′, knocks down, thus allowing it to be transported on trucks. Employing three tellers, it can offer all regular banking services. Unit is also suitable for use at fairs and expositions.



CO-OP WITH A VIEW PLANNED FOR PITTSBURGH

Spectacular views of Pittsburgh's Golden Triangle, the rivers, and neighboring areas will be enjoyed by owners of apartments in 1000 Grandview Avenue, a proposed apartment building atop Mount Washington. The building, designed by Tasso Katselas, will contain 70 one-, two-, and three-bedroom apartments. With a structure of reinforced concrete, it will be supported on concrete caissons drilled about 30 ft into the mountain. The owners are considering the inclusion of a large fall-out shelter for tenants. Exterior will be brick and glass, with generous balcony space.

Long-Awaited Opening for Pittsburgh Dome

The pride of the steel industry, Mitchell & Ritchey's Pittsburgh Public Auditorium, has had its long-awaited dedication, and was attended by Governor David L. Lawrence and Mayor Joseph M. Barr, plus countless lesser officials. First shown by P/A in January 1951 (p. 67), the dome underwent a number of revisions over the years, but retained the basic concept of a stainless-steel, retractable-roofed structure covering an area adaptable for everything from symphony performances to the "Ice Capades".

Resort Plans?

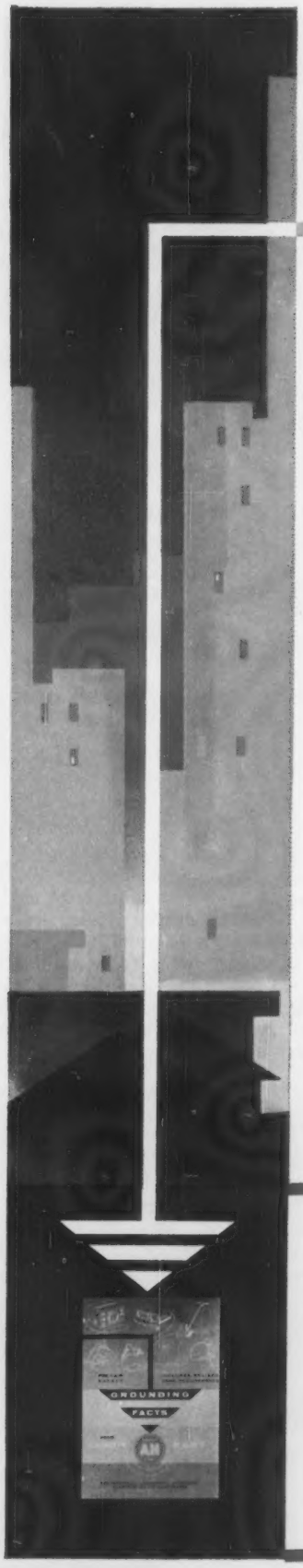
E. M. Abraben, author of the forthcoming Reinhold book on design and planning of resorts, tells P/A that plans, renderings, and photographs of resorts, resort hotels, and resort city planning will be accepted until January 15, 1962, and considered for publication in the book.

Wright on Wax

During one of his stays at his New York stamping grounds, the Hotel Plaza, Frank Lloyd Wright was bearded in his den by the ebullient girl owners of Caedmon Records and prevailed upon to fill two sides of a long-playing disc with his observations on architecture, planning, and life in general. The record is now available from Caedmon, 461 Eighth Ave., New York 1, for $5.95.

CALENDAR

National Conference of American Institute of Planners is in Detroit, November 26-30, at Statler Hilton Hotel. . . . Theme for 1962 National Engineers' Week, February 18-24, will be "Economic Growth Through Professional Engineering." . . . March 19-21 will see National Electric Comfort Heating Exposition and Symposium at Hotel Sherman in Chicago. . . . Museum of Modern Art will be scene of five programs arranged by New York's Architectural League. Subjects and dates are: "The Transformation of Park Avenue," November 16; "How Money Designs the City," December 7; "The Laws of the Asphalt Jungle," February 8; "The Present Without Past or Future," March 15; and "The Ideal City," April 19.



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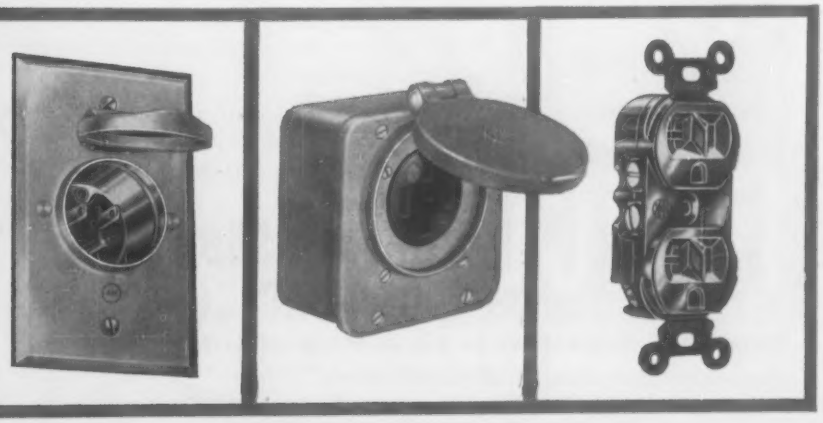

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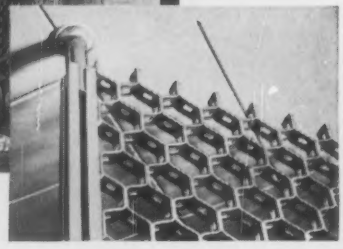

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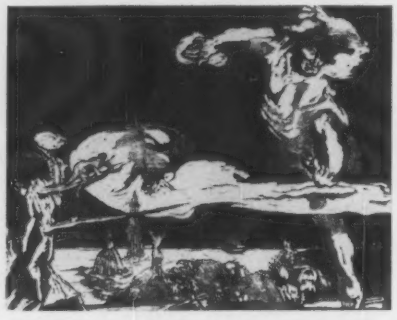
FIGURATIVE RENAISSANCE

The upswing in popularity of figurative and semifigurative art that has been gaining impetus in the past year and a half (prodded along by John Canaday, art critic of *The New York Times*), continues with the first gallery exhibits of the fall season.

Bernard Reder, subject of a giant show at the Whitney Museum, is also enjoying a large exhibit of his drawings, lithographs, and woodcuts at World House Gallery. Many of his fantastic images come off, but, as in the case of the Whitney show, there seems to have been insufficient editing and uneven selection of the works exhibited. The woodcut shown is "Giant



Escaping the Flood." (For another view of Reder, see p. 232.)

Max Ernst, who was given a show at the Museum of Modern Art last year, is having an impressive exhibit of 75 works at the Bodley Gallery. The pieces date from 1919 to 1960, and include works from his Dadaist period plus a group of tiny paintings (smallest is ½" square) illustrating his poem "Sept Microbes." Shown here is the 1949 collage "Skull."

Continued on page 81

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After 21 years of wear, these hospital windows with Schlegel weatherstripping still operate perfectly

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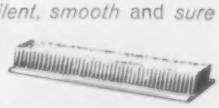

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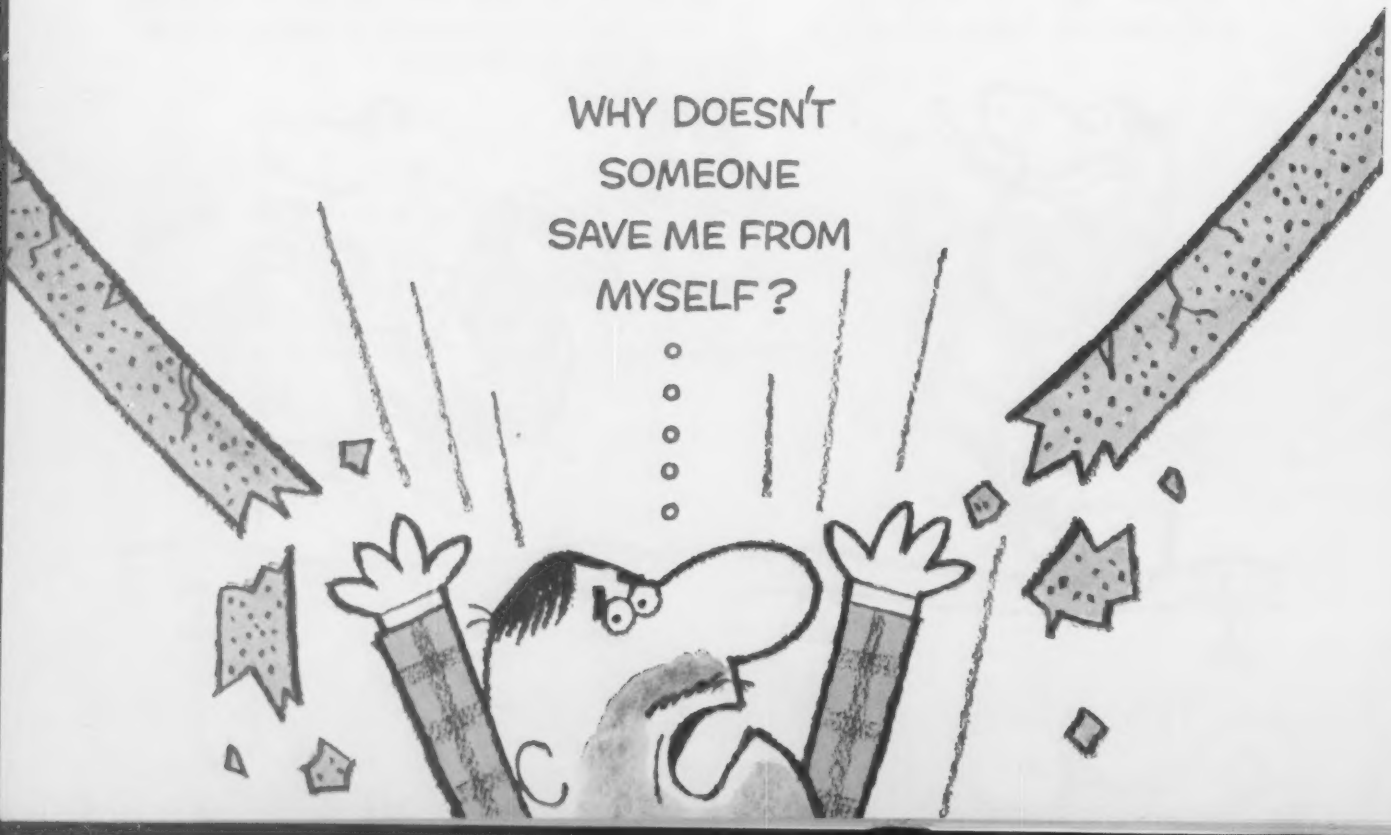
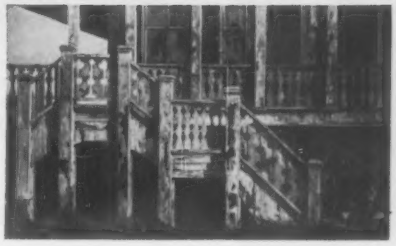


Continued from page 76

At the Bertha Schaefer Gallery, the bronzes of Elisabeth Frink display the human figure and animals in terms of molten virtuosity. The sculptures,

such as "Fallen Man," shown here, convey a feeling of inner vigor.

In the mood of atmospheric realism, Thomas Yerxa at the Janet Nessler Gallery presents observations of city and country scenes focussed just individually enough to remove the picture-book peril latent in representational painting of this kind. Pictures like "Courtyard" and "Gingerbread Porch" make one wish the artist would concentrate further on architectural themes.



The painted steel sculptures by David Smith at the Otto Gerson Gallery, although not in the "figurative" genre, do include two pieces which *may* be Smith's tip of the hat to the new mode. They are "Ninety Father" and "Ninety Son," shown here taking the air near Smith's studio in upstate New York.

As a footnote to the rise of the figurative school, one of New York's newest galleries, the Kingworthy, recently opened with the intention of showing "figurative works of art."

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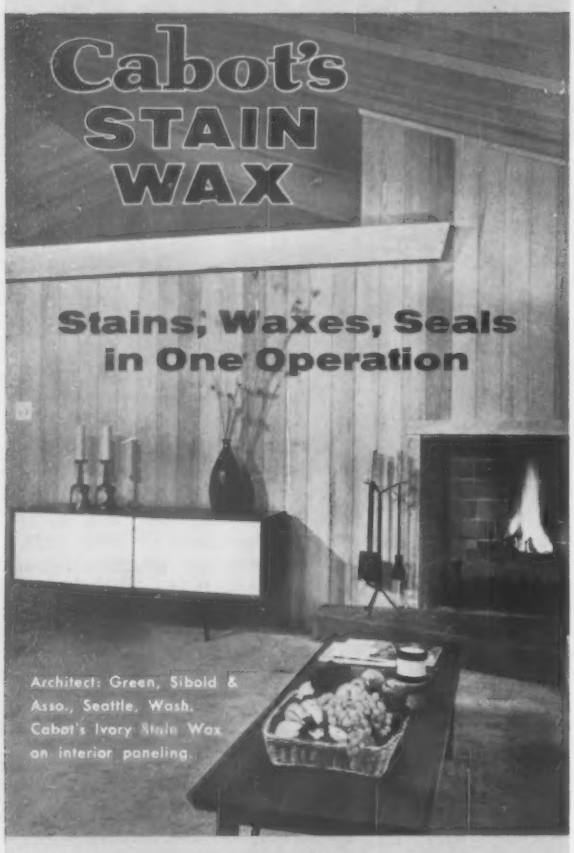

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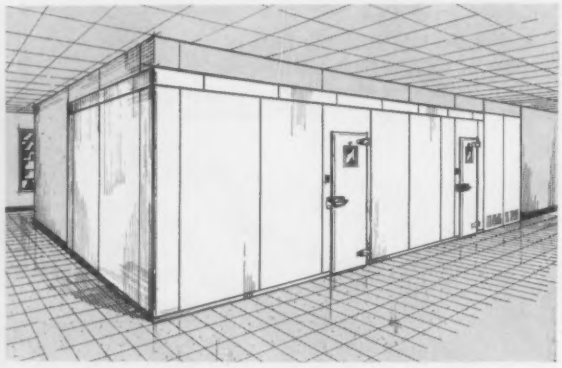

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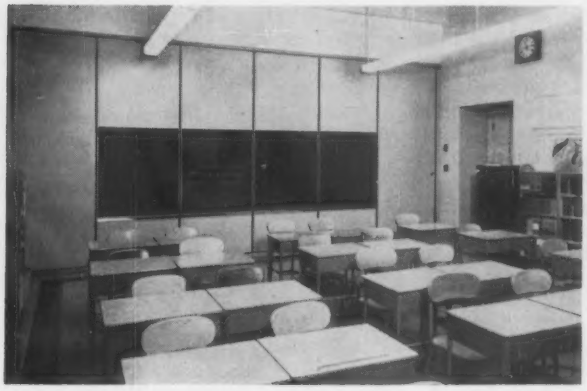

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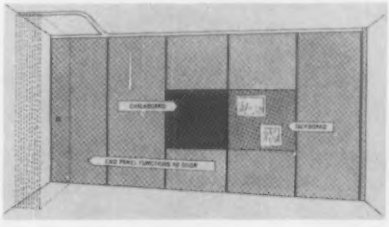
CLEVELAND, OHIO Climaxing a three-year period of research and development, the E. F. Hauserman Company recently announced a movable, acoustical wall system called "Operable Wall." Although the system was designed primarily for schools, it is equally suitable for other institutional and commercial applications.

Operable Wall consists of steel-faced panels with rock-wool sound insulation core and continuous neoprene gasketing at perimeters and panel joints to eliminate sound seepage. When fully opened, the wall has a fixed, permanent appearance. It slides on a hanger assembly employing nylon rollers, and is kept sturdily in place when open by a stainless steel floor guide. A communicating end panel permits access between divided areas. If desired, chalkboard and tackboard work surfaces can be applied to the panels, which are manually operated, obviating mechanical breakdowns. A 30-ft wall system will stack in an area less than 2 ft deep.



Full-scale, carefully conducted tests have shown that Operable Wall has an over-all average of 39 db sound reduction, and 42 db sound reduction in the speech privacy range. The E. F. Hauserman Co., 5711 Grant Ave., Cleveland 5, Ohio.

On Free Data Card, Circle **100**

NEW "SANDWICH" ORDER: PLASTIC ON CONCRETE

BELLEVUE, WASH. The new factory recently erected here for United Control Corporation features a tilt-up wall panel system utilizing interior and exterior concrete slabs sandwiching cores of foamed plastic insulation board. The plant was designed by Kirk, Wallace, McKinley & Associates.

The panels were fabricated on the job site, and are of two sizes: 9′ x 12′ and 22′ x 12′. Interior and exterior concrete slabs are each 1¾″ thick, and the plastic inner core is 1½″ thick. Cores are made from "K-Thermo" board manufactured by Kirkland Industries, using Koppers "Dylite" expandable polystyrene.

Wooden forms for panels were laid on completed plant floor, reinforcing steel was placed, and the inside face of the panel poured (*right*). While this was still soft, cores were placed firmly for good adhesion. More reinforcing steel was then placed and the outerface poured. Insulation board was kept back 6 to 8 in. from the edges of the panels so that the concrete joined and sealed the insulation. Koppers Co., Inc., 430 Seventh Ave., Pittsburgh 19, Pa.

On Free Data Card, Circle **101**

Teaching by Tape

This complete "Tape Teaching Laboratory" at Dominican College, Racine, Wis., answers all requirements of tape teaching: listen, listen-respond, and listen-respond-record. Included are 35 booths, 4 "Ekotape 322" recorders, plus a turntable (*upper left*) for special disc recordings. Control center can be operated by one or two instructors, depending on need and on languages taught. All Webster components are engineered and produced within its own organization to simplify both installation and maintenance. Webster Electric Co., Racine, Wis.

On Free Data Card, Circle **102**

Do-It-Yourself A-V Presentations

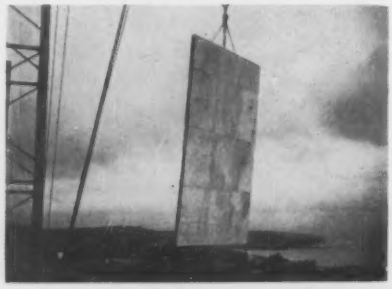
New "Audio Graphic System" provides a synchronized sound-and-slide presentation; one of its chief advantages is the ease with which offices can prepare their own audio-visual programs. Recording is done on the basic unit, and a 35 mm camera is used to prepare slides. Electronic pulses that automatically change the slides are recorded on the tape along with the prepared commentary.

Basis of the system is the 35-lb "Instructor" unit, which contains rear-projection screen, amplifier, tape deck, speaker, earphones, volume control, and operator-controlled footswitches. A "slave" projector may be connected to the unit for big-screen showings before groups. The portable unit is capable of three methods of operation: *continuous* (pictures and synchronized sound change automatically from start to finish), *demand* (tape mechanism automatically stops at end of each block of commentary, leaving the picture on the screen until footswitch is pressed), and *timed* (machine automatically restarts after a predetermined interval). Dept. 114, Graflex, Inc., Subsidiary of General Precision Equipment Corp., Rochester 3, N. Y.

On Free Data Card, Circle **103**

Precast Panels With Marble Faces

The recently completed Washington Building in Tacoma, Washington, employs precast, marble-faced, reinforced concrete panels on the major portion of its exterior façade. The panels are

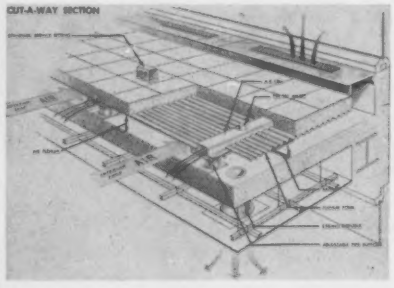


the result of a new construction technique developed by Naramore, Bain, Brady & Johanson, architects of the building, and The Georgia Marble Company. In casting the panels, the marble sections were placed face downward in steel frames, a ¼" protective coat of white cement mortar was cast against the marble, followed by a 2⅜" layer of concrete. After the concrete matured, panels were lifted and rocked into vertical position and joints were pointed with white cement. Although tests have indicated that the bond of marble-cement-concrete is strong, mechanical anchors were used to further guarantee the structural integrity of the panels. Only nine panel sizes were used on the building, ranging from 10'-8⅞" by 6'-9¾" at 3500 lb down to 5'-11¾" by 2'-1¾" at 500 lb. All panels are 3½" thick. They were anchored to cantilevered floor slabs and to a special steel framework on the face of the building skeleton. Erection was performed by workmen standing inside the building while a mobile crane (*shown*) held panels in position. Panel costs, including marble, precasting, erection, and setting, came to $5.00 per sq. ft. Marble Institute of America, Inc., 32 S. Fifth Ave., Mount Vernon, N. Y.

On Free Data Card, Circle **104**

Utmost Flexibility with Air-Electric Floor

First major application of new "A-E" floor system is in Detroit's Consolidated Gas Building, by Minoru Yamasaki and Smith, Hynchman & Grylls (page 103, SEPTEMBER 1961 P/A). The floor, which combines both mechanical and electrical services in a single system, consists of a secondary structural slab supported *above* the



structural floor. An air plenum provides supply or return air. Wires for various electrical circuits are carried by large cells which are fed by conventional header ducts; close spacing of large cells and preset inserts assures complete flexibility for the life of the building. Among numerous features of the system are its adaptability to various mechanical systems (and to any type of construction, new or old), its savings in floor height, and its effective air distribution. Granco Steel Products Co., 6505 N. Broadway, St. Louis 15, Mo.

On Free Data Card, Circle **105**

Projector Automatically Unites Picture, Sound

Completely automatic is the new portable "AV-Matic Sound-Slidefilm Projector." The projector uses 35 mm, single-frame filmstrip and 33⅓ rpm records; picture changes automatically in perfect synchronization with recorded message, by means of a patented inaudible signal. Unique optical and mirror system projects clear pictures on the 9″ x 7″ screen (in a room that need not be darkened). Unit measures a compact 15″ x 13″ x 18″ and weighs 17 lb, making for easy portability to customers and clients. Audio-Visual Div., DuKane Corp., St. Charles, Ill.

On Free Data Card, Circle **106**

New Roof Insulation Has Highest Efficiency

New Barrett urethane roof insulation gives twice the efficiency of other types for flat built-up roofs. (One inch of the urethane has the same capabilities as 2″ of polystyrene or glass-fiber, or 2½″ of fiberboard.) The material is rigid urethane foam—honeycombed plastic of tiny closed cells—with a layer of roofing membrane laminated to both faces. This tough facing prevents warping, stabilizes the extremely low thermal conductivity, and provides an immediate "walk-on, work-on" surface. Panels can be mopped directly with hot pitch or asphalt. There is no absorption of water, and no chemical/physical deterioration. Price is competitive. Barrett Div., Allied Chemical Corp., 75 West St., New York 6, N. Y.

On Free Data Card, Circle **107**

Plastic Molds Smooth Design in Concrete

Excellent surface finish, hardiness of forms, simplicity of erection, tightness of assembly, ease of re-erection and strippability are some of the virtues claimed for architectural molds for concrete and cast stone made of glass-fiber-reinforced polyester

resins. In project shown, the singing gallery for the Second Presbyterian Church of Fort Lauderdale by architect Harold Wagoner, a study model was made in plastilene; then, after refining, in plaster. Conventional hand layup method of constructing reinforced plastics is used to build up mold. Gel coats are applied to the full-size model to produce a hard, polished surface. Alternate layers of glass fiber mat, polyester resin, and woven materials are then added, plus plywood members. Divisions of the molds and methods of attachment and disassembly styled to the particular design are applied. The full-scale model of the gallery was made in an inverted position (*shown*) for convenience. When identical molds in a series are required, a reinforced plastics master pattern is prepared from the first mold, and duplicates of the mold are prepared. Cost of additional molds is, of course, less than the original mold. George Kreier, Jr., Inc., 1524 Cambridge St., Philadelphia 30, Pa.

On Free Data Card, Circle **108**

Latex Paint Is Now Fire-Retardant

"Fire-Check" for the first time combines the features of fire-retardant paints with the advantages of latex paints: ease of application, washability, water thinning, and quick drying. It is the first UL approved, ready-to-use, latex fire-retardant paint. When painted with Fire-Check, wood or more highly flammable materials will not burn or carry a flame. A bubbling action is automatically triggered by heat from flames to provide a foaming fire barrier that checks the spread of flame until fire-fighting equipment can extinguish the fire. Recommended for interior and exterior use in all types of buildings. Enterprise Paint Manufacturing Co., Ashland Ave. at 29th St., Chicago 8, Ill.

On Free Data Card, Circle **109**

No Expansion Joints in 142,500-Sq-Ft Slab

Not a single expansion joint in a continuous floor slab that is three times the size of a football field? The answer is in high-tensile, welded-wire reinforcing fabric, which is used for the first time in industrial construction in Chicago's new National Biscuit Company plant. The unusual technique is in response to the requirement of a large, smooth, easily cleaned area where rolling equipment could be readily moved about. Paul Rogers & Associates were consulting structural engineers.

Slabs that support live loads of 300 psf are 6″ thick, with two courses of reinforcing fabric—6/0 fabric near the bottom to carry the load, and 3/0 fabric above to withstand expansion and contraction. Where lighter loads are applied, thinner slabs and lighter-gage fabric are used. Altogether, there are nine types and sizes of high-strength fabric. The regular spacing of beams and columns made it pos-

Continued on page 90

never before... TYPE 1* FLAME SPREAD SAFETY WITH WOODFIBER ECONOMY...

Simpson

Acoustical Products now available with

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PYRO-CHEM PROTECTION

*To be listed as Class 1 in the Acoustical Materials Association bulletin XX11-1962 indicating 0-25 flame spread.

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Hamilton Company, Inc.
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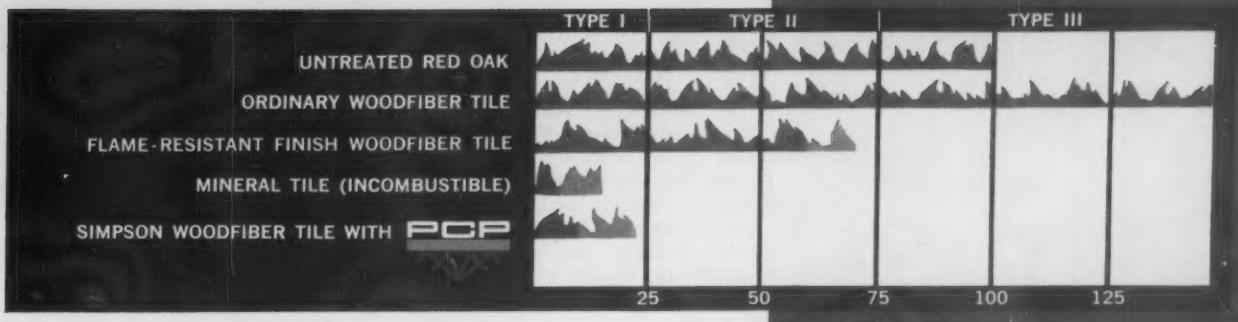

Pyro-Chem Protected woodfiber tile		Flame-resistant finish woodfiber tile*	Mineral tile (incombustible)
Flame Spread	3 - 23	60 - 70	5 - 15
Fuel Contributed	15 - 27	42 - 44	25 - 29

The label shown below appears on every carton of PCP acoustical material. It is your assurance that PCP is produced under the label and inspection service of Underwriters' Laboratories, Inc.

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INSPECTED

ACOUSTICAL MATERIAL

NOT OVER 100 SQ. FT. ISSUE NO. G-918

FIRE HAZARD CLASSIFICATION

(BASED ON 100 FOR UNTREATED RED OAK)

ATTACHED TO OR SUSPENDED FROM NONCOMBUSTIBLE SURFACES WITH NONCOMBUSTIBLE ATTACHMENTS.

SPECIMEN

PCP TREATMENT*

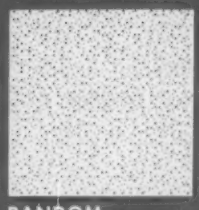
	COATED FACE	BACK FACE
FLAME SPREAD	20	25
FUEL CONTRIBUTED	25 - 35	25
SMOKE DEVELOPED	15 - 25	10

*CHEMICALS USED IN TREATING PCP PRODUCTS ARE WATER SOLUBLE.

Now, on your very next job, you can specify Simpson woodfiber tile containing amazing PCP—and get Type 1 flame spread safety with up to ⅓ savings on material cost. PCP (Pyro-Chem Protection)—another revolutionary new product from the Simpson research laboratories—is a unique process that gives Simpson woodfiber tile a flame spread rating equal to that of far more costly, highest quality *mineral* tile.

PCP performance was confirmed in the Flame Tunnel Test, results of which are shown above. Note the almost indistinguishable difference between Forestone with PCP (bottom line) and mineral tile (second from bottom).

The Simpson Certified Acoustical Contractors listed here will be pleased to show you samples and demonstrate the efficiency of the complete line of Simpson acoustical products with amazing PCP. Before your next job call the one nearest you. All are listed in the Yellow Pages under "Acoustical."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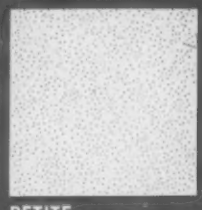
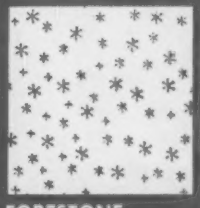
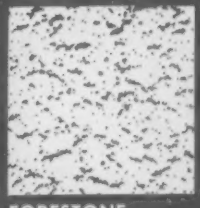

PETITE Pattern


FORESTONE STARLITE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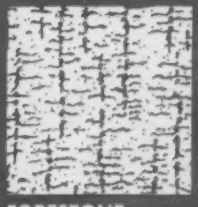
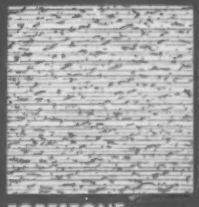

FORESTONE DRIFTWOOD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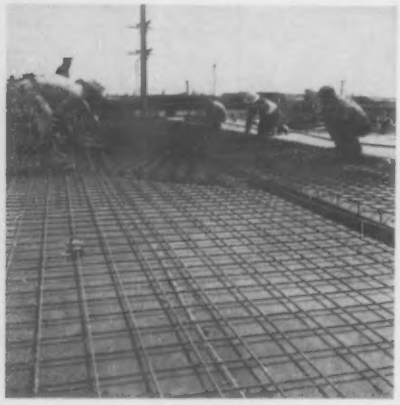
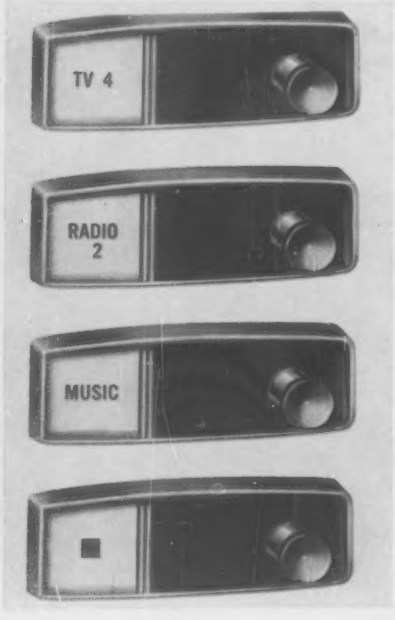


sible to prefabricate uniform-size steel mats, a procedure that brought substantial savings in labor and material over conventional reinforcing methods. American Steel & Wire Div., United States Steel Corp., Rockefeller Bldg., Cleveland 13, Ohio.

On Free Data Card, Circle **110**



Radio-TV-Intercom with Single Unit

"Host 9030" is a new concept for hotel-motel television which picks up radio signals over unused TV channels, and combines TV, radio, background music, and personnel-call systems all in the same unit. The set is constructed so that the 19″ TV receiver performs four functions, each working through a single coaxial cable of any master-antenna system. For new construction, the cost of separate room radios and a separate radio conduit is eliminated. For existing facilities that lack TV or radio, these can now be provided without requiring a separate wiring system for each. Photo shows the user's illuminated window registering the various systems as they are tuned in. TV-Communications Dept., Westinghouse Electric Corp., 353 Park Ave. South, New York, N. Y.

On Free Data Card, Circle **111**

New Floor Coating Resists Thermal Shock

"Penntrowel Flextherm" is a new floor coating which provides resistance to thermal shock or radiant heat conditions. It is particularly applicable for floors (and walls) in dairy, food plant, and packing industries. Other advantages include notable strength and wear resistance and moderate resistance to corrosive chemicals. Available in three colors—tile red, green, and neutral gray—the coating has three components: Flextherm Resin, Flextherm Hardener, and Penntrowel Floor Surface Powder or Penntrowel Regular Powder. Pennsalt Chemicals Corp., 3 Penn Center, Philadelphia 2, Pa.

On Free Data Card, Circle **112**

Acoustical Panels for High-Moisture Areas

Recently announced glass-fiber reinforced-plastic acoustical panel is intended for use in indoor swimming pools and other areas—such as gymnasiums, shower rooms, etc.—requiring high resistance to moisture-laden air. "Kemdot" panels will not rot, mildew, or corrode in these atmospheres, and have high impact resistance to withstand rough treatment in sports areas. Panels are perforated with $\frac{3}{16}$″ holes spaced on ½″ centers in parallel rows, and are available in white or pastel colors in matte finish. Greater noise control can be achieved by laying sound-absorbing pads or blankets behind the panels. Installation is on standard T-bar metal suspension system or screwed directly to treated wood suspension strips. Kemlite Corp., Joliet, Ill.

On Free Data Card, Circle **113**

On-grade Vinyl Flooring

Two-year program of research and testing has produced an inexpensive on-grade vinyl flooring known as "DeLuxe True Vinyl." The flooring, in $\frac{1}{16}$″ gage for residential use and ⅛″ gage for commercial use, can be had in a 10-color range. Only size available is 9″ x 9″. Tile, which can also be used above grade, of course, comes in a pastel-toned marble pattern. At approximately 19 cents per $\frac{1}{16}$″-gage tile retail, it is described as the lowest-cost all-vinyl compound flooring on the market. The Goodyear Tire & Rubber Co., News Bureau, Akron 16, Ohio.

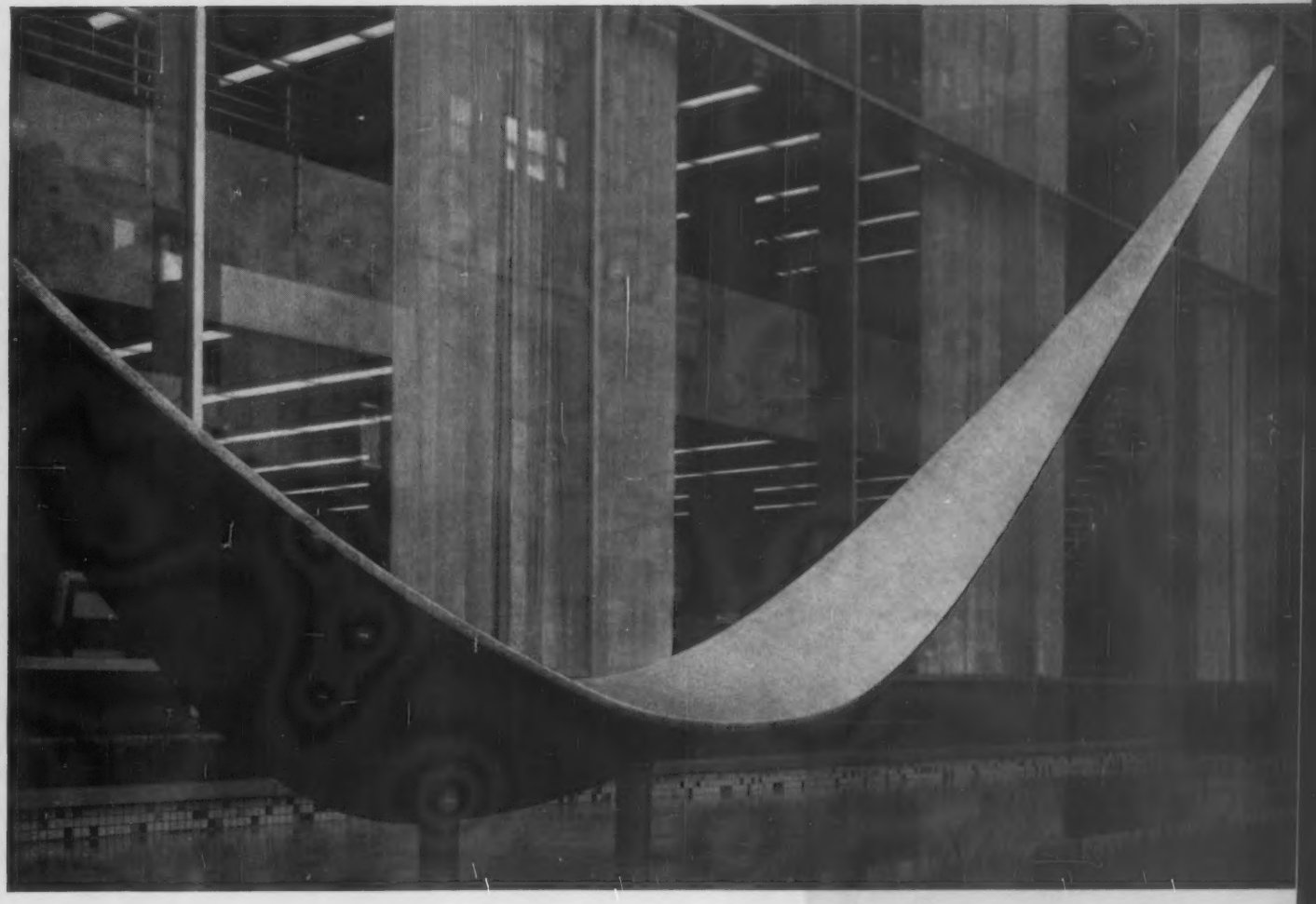
On Free Data Card, Circle **114**

Miller Designs on Flameproof Draperies

Large-patterned drapery fabrics "Pumpkin Seeds" and "Plusses" are printed on "Saranspun," a permanently flameproof fabric manufactured by National Plastic Products Co. Fabric resists soiling or staining, cracking or fraying; is notably good for large window walls. Herman Miller, Inc., Zeeland, Mich.

On Free Data Card, Circle **115**

ATTENTION TO DETAIL



THIS soaring sculptural form graces a small formal garden at Louisville's new Liberty National Bank & Trust Company offices. Inside the handsome glass-fronted building are other exciting design elements: a delicately-balanced, jewel-like mobile, a 600-tile map of Kentucky, a 31-foot oval table for directors' meetings. Attention to detail is evident throughout this modern building, extending to the choice of Dover Elevators to serve its vertical transportation needs. Dover Elevators (formerly Shepard Elevators) are built with meticulous attention to every detail. Motors and motor-generator sets, controls, mechanical components and cabs are all built by Dover to the specific requirements of elevator service, and thus give building owners better performance with less maintenance. Write today for more information.

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DOVER ELEVATORS

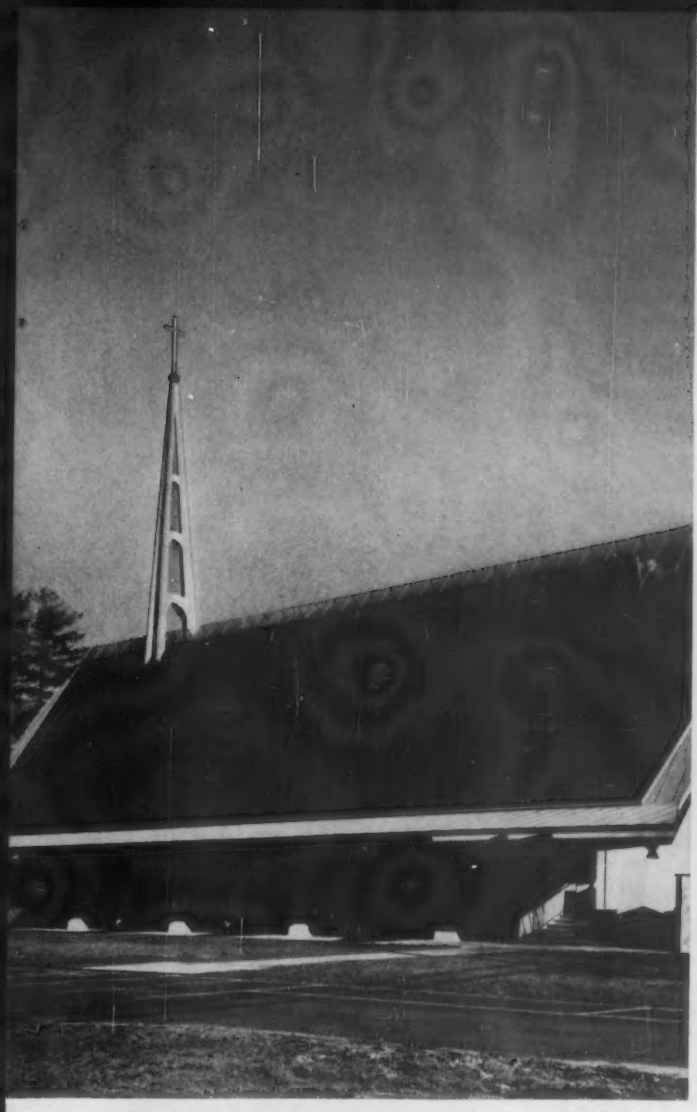
DOVER

DOVER CORPORATION
Electric Elevator Division
1134 Kansas, Memphis 2, Tennessee

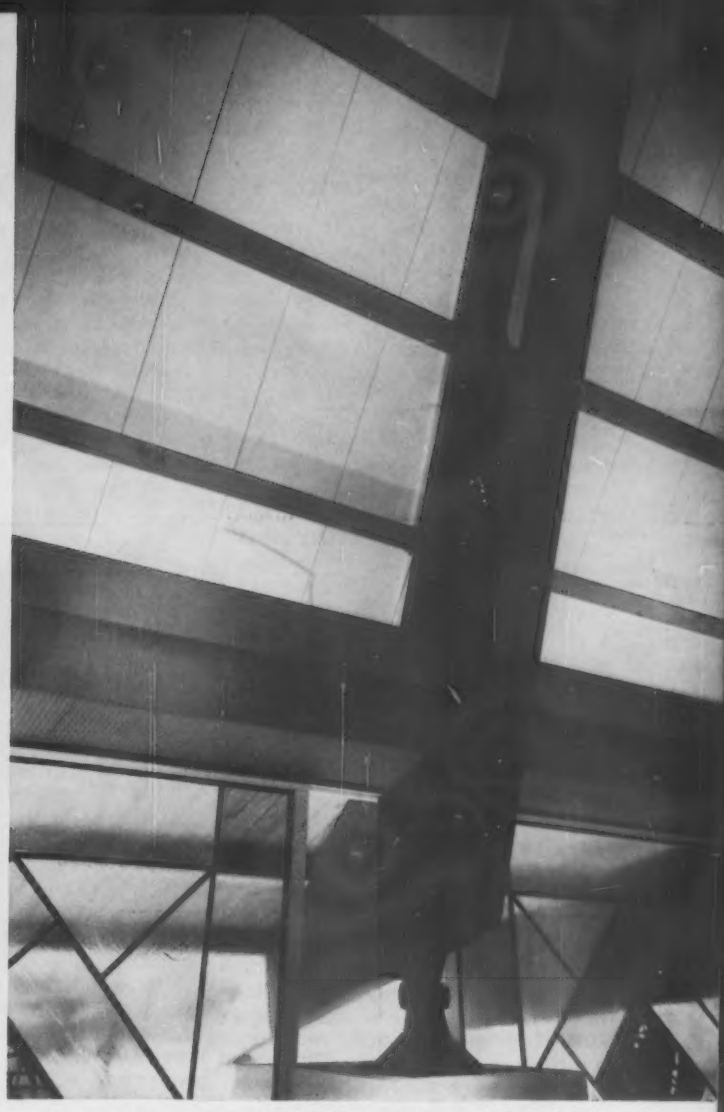
Fine elevators since 1861

Design flexibility of Insulite Roof Deck ideal for contemporary church architecture. This impressive design is a fine example of the movement toward the greater use of contemporary forms and modern building materials in church architecture. This church will seat 500. Provisions have been made for future air conditioning.

White pre-finished Insulite Roof Deck reflects light. In addition, the ridge at the apex is of textured plastic which admits colored light and provides a view of the gold cross on the plastic coated wood fléche, 120 feet off the ground. At the opposite end of the church is the baptistry, second only to the altar as an architectural feature.



Shingles applied directly to roof. 3" Insulite Roof Deck was applied vertically to purlins. Asphalt shingles were nailed directly on the roof deck. The interior surface of Insulite Roof Deck is pre-finished—saves cost of lath and plaster, and interior decoration.



Insulite Roof Deck establishes contrast. Laminated timbers are used as structural members which terminate at point supports on isolated piers. The general feeling created is one of light and spaciousness. White interior surface of Insulite Roof Deck gives pleasing contrast to pre-finished beams.

Design freedom on a modest budget made possible with Insulite Roof Deck

One application provides roof deck, insulation, vapor barrier, pre-finished ceiling

Featured on these pages is Grace Episcopal Church, Massapequa, Long Island. Architects were Edward W. Slater and Daniel Chait, New York City.

The contemporary design is used with a basic plan in keeping with the Episcopal liturgy.

To hold costs down while maintaining the beauty of the steeply pitched open beam ceiling, the architects specified Insulite Roof Deck. This modular material is fast and easy to work with, is an ideal material for a roof of this type.

Insulite Roof Deck cuts application costs way down because it does 4 jobs in 1! It provides a strong, durable roof decking . . . efficient insulation . . . a continuous vapor barrier . . . an attractive finished ceiling that is washable. All this is done in one application!

For technical data and literature showing Insulite Roof Deck in many other buildings and homes, write Insulite, Minneapolis 2, Minnesota.

Design with

INSULITE.

Roof Deck

Insulite Division of Minnesota and Ontario Paper Company, Minneapolis, Minnesota

For more information, circle No. 369

AIR/TEMPERATURE

Directional Diffusers in 5 Styles, 14 Patterns

New all-extruded-aluminum directional diffuser is available in five frame styles and 14 core patterns. With 1-, 2-, 3-, or 4-way air-discharge patterns, the "Type D" diffuser suits the quantity of air required to the space served. Frame styles for square and rectangular units are snap-in, beveled, drop-collar, flange, and lay-on. Catalog gives 12 pages of detailed installation data, as well as complete selection information. Waterloo Register Co., Inc., P.O. Box 147, Waterloo, Iowa.

On Free Data Card, Circle **200**

Zoning Controls for New or Existing Systems

Providing individual room temperature control or zone control—on any new or existing heating/cooling system, air or hydronic—is discussed in new 20-page catalog. The complete line of "Zone-A-Trol" valves, damper actuators, and accessories is described. Catalog fully outlines the application, installation, and wiring of the various types of low-cost motorized zone controls made by the company; also covers in detail the functions of various devices that simplify zoning of any heating or cooling system. Econo Products Co., Division of Viking Instruments, Inc., East Haddam, Conn.

On Free Data Card, Circle **201**

Engineering Data on Large Heating Units

Comprehensive catalog on large heating and ventilating units has been published. The 32-page catalog contains easy-to-read selection charts for steam and hot-water coil capacities; gives fan-motor ratings; and lists dimensional data for all models and sizes produced by Carrier. The units, designed for commercial buildings, schools, churches, auditoriums, and other large spaces, provide heating of 47,000 to 2,990,000 Btu, with air capacities of 1500 to 32,000 cfm. Carrier Air Conditioning Co., Carrier Parkway, Syracuse 1, N.Y.

On Free Data Card, Circle **202**

Heaters in Industry

Industrial Applications of Direct-Fired Gas Heaters, 8 pages, is the second in a series of handbooks devoted to special applications of this equipment. Typical applications discussed in new bulletin include general space heating, special heating for loading-door areas and entries, make-up air tempering, and combination heating-cooling systems. Suggested layouts are illustrated. Handbook also includes an example of a heat-load calculation and equipment-selection procedure for a typical industrial plant. Reznor Manufacturing Co., 62 Union St., Mercer, Pa.

On Free Data Card, Circle **203**

CONSTRUCTION

Data on Vermiculite Costs and Construction

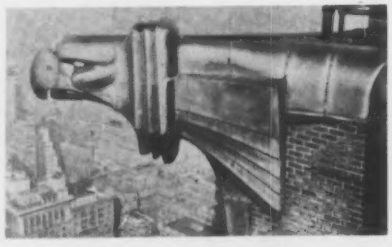
Two new data sheets, each 2 pages, have been issued by the Vermiculite Institute. The first summarizes a recent study on the relationship between fire-insurance costs and the roof construction of schools, supermarkets, and bowling alleys. Analysis of four types of deck shows that vermiculite-concrete roof decks effect an impressive saving in insurance premiums—from 23% to as much as 82%.

The second sheet supplies technical data for placing vermiculite-concrete roof insulation over curved, sloped, and irregular surfaces: domes, folded plates, and hyperbolic paraboloids. Steel decks and formed or precast concrete decks are shown. A table of U values and short-form specifications are included. Vermiculite Institute, 208 S. La Salle St., Chicago 4, Ill.

On Free Data Card, Circle **204**

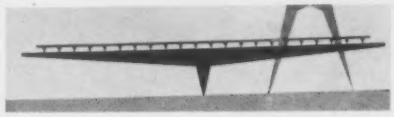
Flashings of Nickel Stainless Steel

Architect's Guide to Nickel Stainless-Steel Flashings contains 24 pages of detailed information on design and



specification. All detail drawings in the booklet are taken from actual installations. The combination of high strength and corrosion resistance assures that nickel stainless-steel flashings perform virtually without maintenance for the life of the building, where proper design, fabrication, and installation methods are used. General information and specs accompany the clearly drawn details. The International Nickel Co., Inc., 67 Wall St., New York 5, N.Y.

On Free Data Card, Circle **205**



Prestressed Concrete Defined and Used

New 20-page booklet describes 21 building types in which prestressed concrete is frequently used, along with the primary reasons for its selection in each case. A brief definition of prestressed concrete, with a description of its manufacture, is also presented. Written in nontechnical language, the booklet is intended for architects, engineers, contractors, and clients. Prestressed Concrete Institute, 205 W. Wacker Dr., Chicago 6, Ill.

On Free Data Card, Circle **206**

Steel-Stud Selection by Slide Rule

New slide rule eliminates time-consuming figuring in the selection of steel studs. By sliding the insert, one can instantly see the ratio of stud size to partition height. Also shown are the spacing of studs, and the weight and type of metal lath to be used. On the back of the pocket-size device is information on "Chan-L-Form" steel studs: flexure formula values, and stud weights for various sizes and spacings. The Bostwick Steel Lath Co., 20 Heaton Ave., Niles, Ohio.

On Free Data Card, Circle **207**

Metal Curtain Walls Low-Rise to High-Rise

New 16-page catalog illustrates case-history use of metal curtain walls in

L-M'S TRADITIONAL LAWN-GLO luminaire combines elegant, graceful design with an efficient modern optical system. Shatterproof acrylic refractor panels direct the light down, eliminate glare, provide efficient light distribution.

L-M's Traditional Lawn-Glo(TM) Light Offers Whole New Lighting Concept

Line Material's new Traditional Lawn-Glo luminaire combines the charm and style of an Early American whale oil lantern with the efficient, controlled illumination of the Lawn-Glo's scientifically designed modern optical system.

The Traditional Lawn-Glo luminaire offers impressive size, tasteful elegance, and long-life, all-aluminum die-cast construction.

The side panels are shatterproof acrylic plastic refractors, with thousands of prisms that direct the light down, not up and out where it is wasted. Available in handsome black and gold, or white and gold finish. It's a good-sized unit—20 inches tall, 12½ inches wide. Takes up to 150-watt lamp; for 3-inch mounting.

Line Material, a leader in outdoor lighting for half a century, offers a complete line of fluorescent, mercury, and incandescent luminaires. Equipment is specially designed for the application and includes luminaires for parks, parking areas, airports, shopping centers, hotels and motels, streets and malls, and many other building and architectural applications. Line Material also makes available, through Authorized L-M Distributors, complete Lighting Application Engineering Service.

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commercial, monumental, and institutional structures. Examples are given of "Series 100" (large, flat panels for enclosing medium- and high-rise structures), "Series 300" (structural-aluminum grid system for low-rise buildings), "Series 400" (commercial grid for high- and extra high-rise structures), and "Series 500" (commercial grid for medium- and high-rise buildings). Cross-sectional drawings, photos, and application data are given throughout the catalog. Albro Metal Products Corp., 944 Longfellow Ave., New York 59, N.Y.

On Free Data Card, Circle **208**

Standardized Borings

Recommended Standard Boring Specification for Cased Borings, 6 pages, has been published to help standardize contract specifications requirements, as well as methods of performing foundation test borings. It is the hope of the TBCA that the standardization of test-boring methods among professional engineers and architects will result in greater uniformity and better quality of work performed by test-boring contractors, and that standardization of contracts will eliminate misunderstanding as to the respective responsibilities of the test-boring contractor and of the architect or engineer. Test Boring Contractors Assn., 11 W. 42 St., New York 36, N.Y.

On Free Data Card, Circle **209**

DOORS/WINDOWS

One-Page Catalog

Comprehensive catalog of metal doors and frames has been compressed to a single large sheet. The reference sheet is intended to simplify selection of the proper frame for the wall construction, and the proper door for the specified use. Standard door types are illustrated, as are typical transoms, side lights, and borrowed lights. Standard jamb and wall details are drawn at 3/8" scale, for tracing. The Steelcraft Manufacturing Co., 9017 Blue Ash Rd., Cincinnati 42, Ohio.

On Free Data Card, Circle **210**

Pass-Through Windows

Idea folder assists in the design and specification of vertical sliding pass windows used in food-service areas. New Underwriters' Class B labeled unit, presented in folder, is available in two arrangements. "Regular" type is for normal application and features a single slide-up door panel, whereas "Telco" type is primarily for use where ceiling height is limited. Construction is stainless steel throughout, or plain steel with prime finish or baked-enamel finish. The Richmond Fireproof Door Co., P.O. Box 911, Richmond, Ind.

On Free Data Card, Circle **211**

From Industrial Sash to Glass Block

New 12-page booklet demonstrates the advantages of replacing sash with glass block in industrial plants. Featured in the booklet are "Shade Green" functional block and "Shade Aqua" decorative block, each with soft color a part of the glass itself. Before-and-after case histories of plants and offices are illustrated, as are the various block patterns available. Installation data and specifications are also provided. Kimble Glass Co., Subsidiary of Owens-Illinois, P.O. Box 1035, Toledo 1, Ohio.

On Free Data Card Circle, **212**

Store-Front Shapes

Detailed drawings of a comprehensive line of extruded-aluminum store fronts —the "Bon-Vue" line—are provided in new portfolio. A total of 68 shapes is shown, all in full-scale and quarter-scale drawings. Extensive drawings cover box-frame system and flush-frame system. Additional drawings are of head, jamb, and sill covers; division bars; and expansion joints. The William L. Bonnell Co., Inc., Newnan, Ga.

On Free Data Card, Circle **213**

Strong Overhead Door Is Translucent

Folder, 4 pages, introduces new industrial door, which is translucent and strong, yet weighs only one-third as much as comparable-size wood or metal doors. In addition, the reinforced glass-fiber sections of the "Filuma 2800" overhead door are available in five colors. Sizes are up to 24' wide and 16' high. Brochure describes the door's features and gives specifications. Frantz Manufacturing Co., 301 West Third St., Sterling, Ill.

On Free Data Card, Circle **214**

ELECTRICAL EQUIPMENT

Reprint of IES Illumination Levels

A section of the official *IES Lighting Handbook*, showing the minimum recommended levels of illumination for every task, has been newly reprinted. The reprint, 16 pages, replaces all previous publications on the important subject of illumination levels, many of which are substantially higher than ever before. Write (enclosing 20¢) to: Illuminating Engineering Society, 1860 Broadway, New York 23, N.Y.

Metal Cellular Louver

Brochure, 4 pages, describes the design of luminous ceilings with "Metalcel" steel ceiling panels. The new Metalcel panel is a strong hexagonal-celled sheet with low surface brightness and high efficiency. Made from a single steel sheet, the panel will withstand a crushing load of 1450 psi without cell deformation. In addition to giving strength and rigidity, steel construction also eliminates dust-attraction, and allows installation below sprinkler heads. Brochure contains data required for calculating total lumens, and illustrates typical installations in offices, banks, and homes. Two additional features—ease of cutting and self-support without bending—are also shown. Specifications outline is given. Fannon Products Div., Hupp Corp., 3000 E. Woodbridge, Detroit 7, Mich.

On Free Data Card, Circle **215**

New Quality Troffer

"Imperiale Series" troffer—"designed to meet the most critical structural requirements . . . achieving the ultimate in appearance and performance"—is presented in 4-page folder. An additional 3 data sheets show various louvers used with the troffer. Advanced design of the Imperiale is diagramed, and includes the following items: heavy, precision-tailored housing; fastest, easiest installation; hinging from either side; sealed against light leakage; dependable, smooth-performing latches; strong new envelope door; and wide choice of lenses and diffusers. The troffer is engineered for use with

BIRD KING-TAB ARCHITECT SHINGLES *roof this church with safety*

ST. ANTHONY DE PADUA CHURCH, SOUTH BEND, IND., *Anthony J. Panzica, architect.*

THIS HOUSE OF WORSHIP is roofed with beauty and dignity as well as protection. It is another example of the Bird Architect's perfect conformity with architectural design. The color, Royal Ermine, gives a special purity, 170 squares used in a dazzling expanse.

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GREATER SAFETY, TRIPLE PROTECTION: 300 lbs. per square, thick as standard slate; and 3 full layers of protection at every point, with 5″ exposure.

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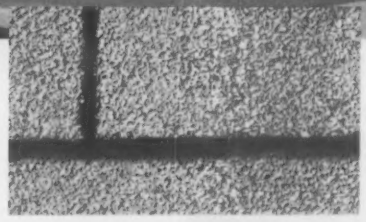

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MOISTURE AND TERMITES A PROBLEM? *Write Bird for details of Bird Termite and Vapor Prevention System*

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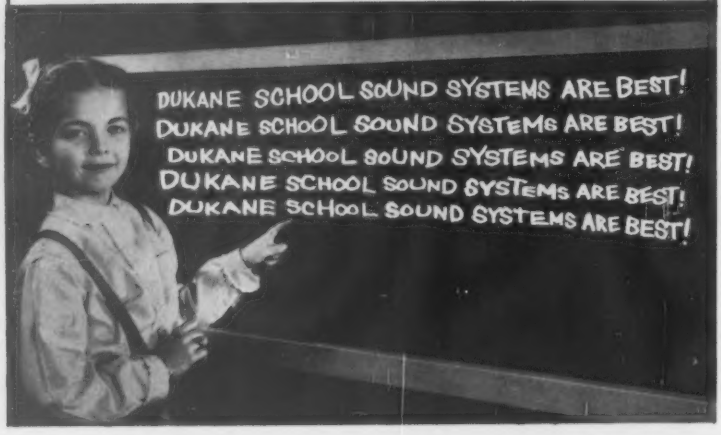
DUKANE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MORE THAN 300 REASONS WHY DUKANE SCHOOL SOUND SYSTEMS ASSURE QUALITY SOUND PERFORMANCE

REPUTATION—DUKANE engineering "know-how" in the field of school sound systems is widely recognized. Each school sound system is built with all the scientific quality control that modern industry commands. Perfection in quality sound reproduction and maximum functional utility are integral design features of every system. FLEXIBILITY—DUKANE modular construction provides for future expansion. Advanced electronic design eliminates costly custom design time and modification. There is a DUKANE School Sound System to meet every size school requirement. INSTALLATION AND SERVICE—Over 300 DUKANE Sales-Engineering Distributors across the nation assure customer satisfaction beyond the sale. From tailoring a school sound system to meet needs and budget, supervising installation, instructing personnel in operation to assuming the responsibility for satisfaction during the years of usage, DUKANE Sales-Engineering Distributors provide the final link between manufacturer and ultimate user that assures quality sound performance.

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Three Channel System, Four microphone inputs, many deluxe extras. Serves up to 150 classrooms or areas.

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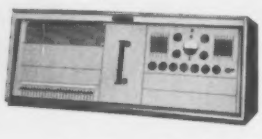


Dual Channel System, Four microphone inputs. For schools with up to 75 classrooms or areas.

DUKANE CORPORATION
DEPT. PA111 ST. CHARLES, ILLINOIS

Write for Bulletin

For more information, turn to Reader Service card, circle No. 340

a number of basic ceiling constructions. Litecraft Manufacturing Corp., 100 Dayton Ave., Passaic, N.J.
On Free Data Card, Circle **216**

FINISHERS/PROTECTORS

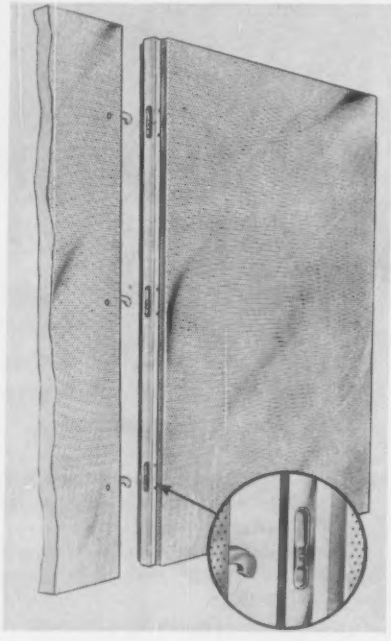
Choosing Color for Wood

New manual, *Wood Color in Relation to Illumination and Color Environment,* shows the mechanics of selecting complementary colors and lighting to enhance various woods. Prepared by a leading color authority, Walter Granville, the manual includes a precise colorometric theory amply illustrated, explains the influence of illumination, and liberally covers the wide range of color effects obtainable with modern finishes. American-Marietta Co., 101 E. Ontario St., Chicago 11, Ill.
On Free Data Card, Circle **217**

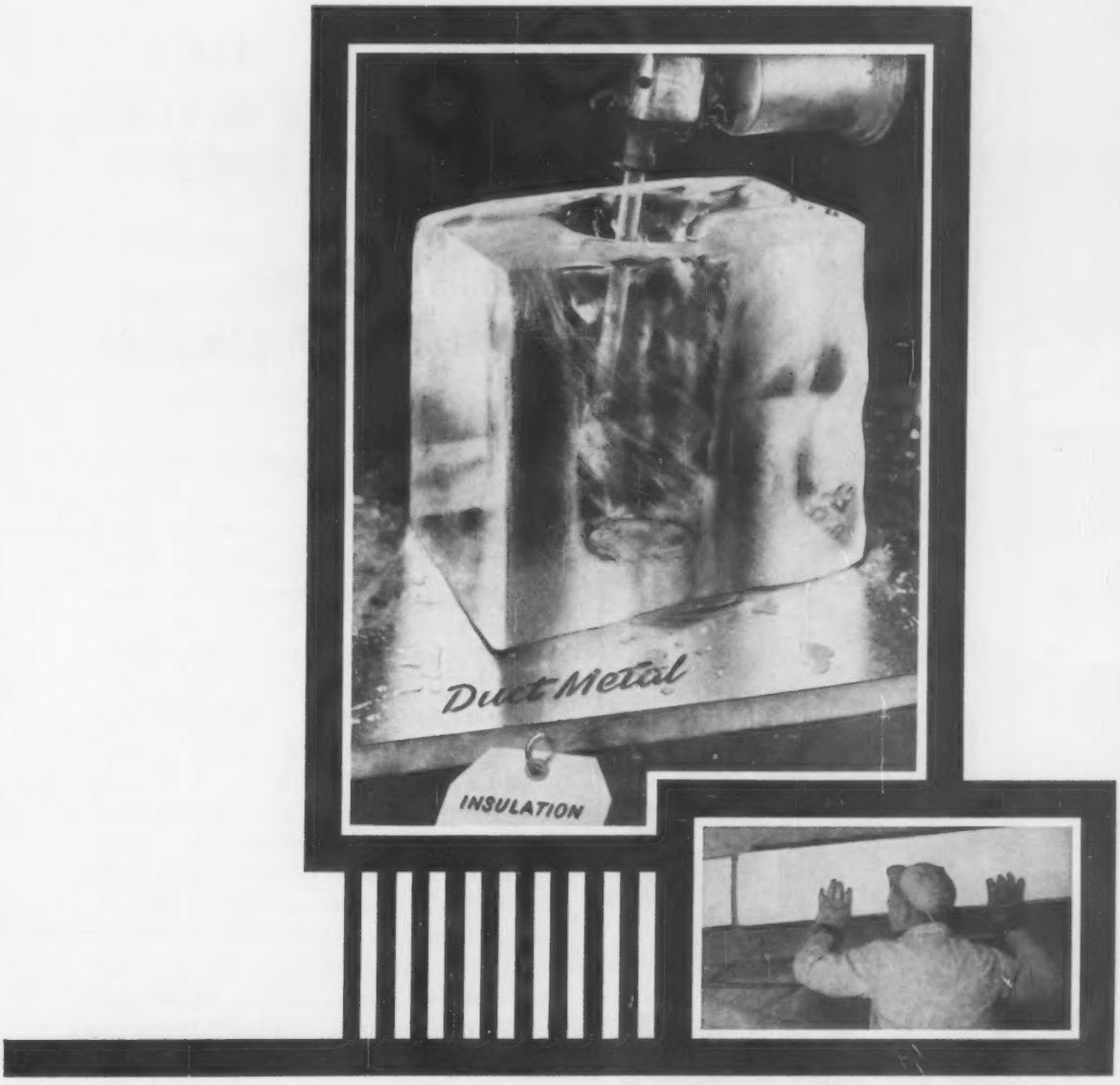
INSULATION

Acoustical Panel Is 1" Thin

Folder, 6 pages, describes complete line of "Noiseguard" acoustic panels, modular in construction, used as sound



barriers and enclosures for the control of noise in offices, industrial plants, and laboratories. The "Series 10" panel of 1" over-all thickness is certified to provide greater sound attenuation than conventional 4" panels. It is



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Whether operating conditions are sub-zero or torridly hot, there are 3M® Brand Insulation Adhesives that can stand the punishment. Insulation Adhesive Tacky, for example, provides strength-to-spare bonds that are *not* weakened even by –35°F temperatures or by heat up to 300°F for continuous service, up to 500°F for short periods! 3M provides a complete line of insulation adhesives for various temperature and application requirements. They bond insulation to insulation, to ducts, to wall and other surfaces—provide other advantages as well. For instance . . .

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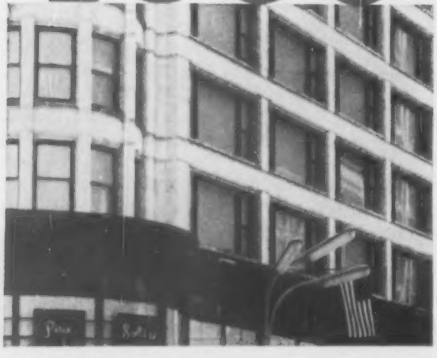
For every construction need, 3M provides today's most complete, most reliable adhesive line. Besides insulation adhesives, there are 3M products that seal high-velocity ducts, curtain walls, other joints and surfaces . . . that bond ceramic, clay, vinyl and rubber tile as well as wood, laminates, other materials. For complete information, see Sweet's Catalog, your distributor, or send for the new booklet that explains the entire 3M construction adhesive line. Write AC&S Division, 3M Company, Dept. SBC-111, St. Paul 6, Minnesota.

Adhesives, Coatings and Sealers Division 3M COMPANY

For more information, turn to Reader Service card, circle No. 368

STEEL 1961

JOINS STEEL 1899



in Louis Sullivan's Architectural Masterpiece

"There was never any question of the material to be used. Steel was the proper choice for the modern eight-story addition now in construction on the famous Carson Pirie Scott building in Chicago," says Mr. Harry F. Manning of the firm of Holabird & Root, architects. ■ Designed as a completely steel-framed structure by Louis Sullivan of the world famous "Chicago School" of architects in 1899, the original building has been added to in 1903, 1906 and now in 1961. Each addition has preserved the amazingly clean and modern lines of the original Sullivan design. As in the original conception, the great cellular elevations are bold, exact and perfectly proportioned articulations of the steel frame. Steel, the building material of proven strength, durability and economy has been used again in the latest addition. ■ In the first portion of the structure, columns were formed of a combination of angles and straps of formed plate. Columns in the new section make use of modern, high-strength, wide flange beams utilizing present day steel's far greater economy and far superior carrying capacity. ■ Among architects and engineers the world over, the Chicago School of the late 1800's has long been associated with the invention and mastery of steel framing and the consequent development of today's modern structures. As many point out, the contemporary statements of today are a refinement of the principles developed as early as 1879, the articulated wall taking its power and beauty from the formal possibilities of steel framed construction.

Use Steel for Modern Construction

STEEL CONSTRUCTION PROVIDES

unlimited expansion potential

Additions to existing structures are relatively simple, with geometric steel framework repeating or augmenting the basic design of the original building. Joining new steel beams to old in the creation of new bays or even entire wings, is easier and far more economical both of time and money than is the case with most other types of building material.

design freedom

From the cube to soaring arches and space-spanning domes—from the triangle and the pyramid to tridimensional hexahedrons and tetrahedrons. From the simplest of warehouses to highrise office buildings or the complexities of church architecture, steel enhances free expression and architectural creativity.

and strength with lightness

For today's modern steels have great load-carrying capacity—minimize dead load stress—reduce foundation costs—can be fabricated into forms of the utmost lightness and grace while lending rigidity and rugged strength to the structure.

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For more information, circle No. 353

a fire-retardant, self-supporting acoustical core sandwiched between sheet metal. Brochure describes the construction features responsible for this performance, among them an acoustical core with sufficient structural integrity to eliminate stiffeners that act as sound bridges, and sheet-metal surfaces deadened by a visco-elastic damping coating. The Korfund Co., Inc., 08D Cantiague Rd., Westbury, N.Y.

On Free Data Card, Circle 218

SANITATION/PLUMBING

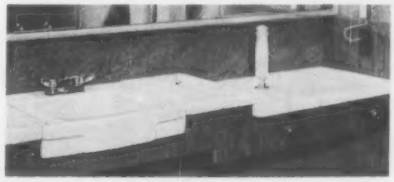
New U. S. Standard on Plastic Sewer Pipe

New edition of *Commercial Standard 228-61*, which includes plastic sewer pipe in 8", 10" and 12" diameters, has been published by the U.S. Department of Commerce. The new standard supersedes previous editions, providing a recognized specification for architects, engineers, and municipalities. Plastic pipe is the newest material designed for sewerage systems. Its acceptance has become widespread because of several revolutionary features —particularly its ease of jointing by "solvent welding," a process of chemical fusion whereby the weld becomes the strongest part of the pipe. Longer lengths, light weight, nonabsorption, and high chemical resistance are additional advantages. Evanite Plastic Co., Div. of Evans Pipe Co., Carrollton, Ohio.

On Free Data Card, Circle 219

Catalog of Fixtures

In a catalog entitled *The World's Finest Plumbing Fixtures for 60 Years*, Universal Rundle presents 40 pages of data on its fixtures. Described and illustrated are bathtubs, lavatories, water closets, urinals, drinking fountains, sinks, and fittings. Complete dimensional data is included. A number of exclusive items are highlighted — among them the "Versa-Tile" combination lavatory and counter top, and the "Ever-Dry" anticondensation water-closet tank. Universal-Rundle Corp., P.O. Box 960, New Castle, Pa.



On Free Data Card, Circle 220

R-W FOLDING PARTITIONS

• *Four-Way R-W Folding Partitions, Janesville, Wisconsin Senior High School. Architects: Law, Law, Potter and Nystrom.*

• *R-W Movable Walls in the Netherland Hilton Hotel, Cincinnati, Ohio.*

• *R-W Folding Partitions of a special sound retarding design in a Chicago TV Studio.*

FOR THE SUCCESSFUL FULFILLMENT OF YOUR DESIGN CONCEPT

Modern, movable interior room dividers provide an interesting and economically practical method for architects to design flexible room arrangements to meet a variety of needs. However, too often the excellent design concept falls apart in actual application because of the installation of partitions that will divide space but do not eliminate sound interference between areas. R-W Folding Partitions, the result of years of research, engineering development and practical know-how, offer quality construction, trouble-free operation, rugged strength and excellent sound retarding qualities. Available in a type and size to meet your *exact* design requirements.

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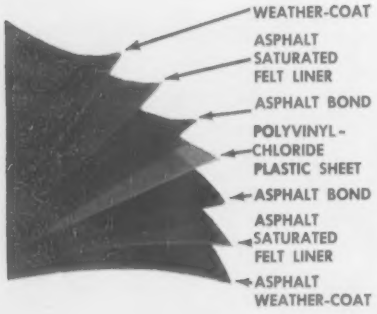
NEW SEALTIGHT®

"MEADOWMAT"

ASPHALT-PLASTIC LINERS



. . . for the containment of water, chemicals, brines and sewage.

"MEADOWMAT" Asphalt *armor-coated* plastic Liners combine the strength and elasticity of polyvinyl-chloride plastic with the efficiency and durability of asphalt. This new and unique mat-type liner will effectively solve many problems faced in the control of liquids. Specifically developed to meet the present need for a light-weight, low-cost durable and efficient lining material. "MEADOWMAT" Liners provide a strong, durable material with weight and substance that is easy to place without worry of punctures or tears. Easy to join and seal on-the-job... highly resistant to weathering under exposure to the elements and most acids, alkalais, salts and micro-organisms. "MEADOWMAT" Asphalt-Plastic Liners are nominally one-eight inch thick and presently available in sheets 4′ wide, lengths up to 15′ and weigh three-quarter pound per square foot.

IDEAL FOR LINING . . .

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- CHEMICAL TREATMENT PONDS
- SEWAGE LAGOONS
- GENERAL CONTROL OF LIQUIDS

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For more information, circle No. 406

Roughing-in Data for X-Ray Equipment

Loose-leaf reference file, 64 pages, contains scale drawings and specifications on X-ray processing tanks, tank inserts, coolers, and all standard X-ray accessories. Complete plumbing roughing-in details are included in this comprehensive guide to architectural layouts. Bar-Ray Products, Inc., 209–25th St., Brooklyn 32, N.Y.

On Free Data Card, Circle 221

New Treatment Plants

New brochure, 12 pages, describes Dorr-Oliver's recently introduced series of compact sewage-treatment plants. These units are especially designed for housing developments, industrial sites, shopping centers, etc., either where municipal sewage treatment is unavailable or where costs of tying in to existing sewer systems are prohibitive. The brochure explains design and operating features, installation practices, and leasing arrangements. Dorr-Oliver Inc., Stamford, Conn.

On Free Data Card, Circle 222

SPECIALIZED EQUIPMENT

All Kinds of Parking for All Kinds of Cars

New planning aid for architects is the 40-page *How to Lay Out a Parking Lot*. The manual takes into account dimensions of all 1960 and 1961 car models, including compacts which can be placed effectively in reserved areas. Detailed sketches and photos provide a variety of parking-lot plans — 90-degree, 60-degree, and 45-degree — with recommended individual-stall dimensions, aisle widths, and entrance and exit sizes. Patterns described include straight-row parking, perimeter and island parking, slanted stalls, herringbone, and V-shaped. Minimum requirements are also given for specialized parking lots serving such facilities as amusement centers, stadiums, banks, churches, hotels, and theaters. Western Industries, Inc., Parking Gate Div., 2742 W. 36th Place, Chicago 32, Ill.

On Free Data Card, Circle 223

Ideas for Using Canvas

Decorating and Shading with Colorful Canvas, 24 pages, is a source book of ideas on the uses of this sturdy cotton

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Individual panels are 36″ wide, heights to 12′...panels are constructed with tongue and groove for rigid, flush installation. Available in a wide variety of facing finishes. Applications are unlimited . . . ideal for Hotels, Restaurants, Offices, Funeral Parlors, Schools, Churches, Motels and Commercial Buildings.

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IN SWEET'S ARCHITECTURAL FILE

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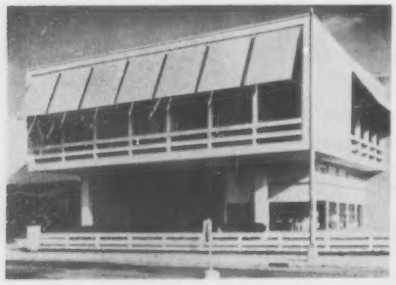


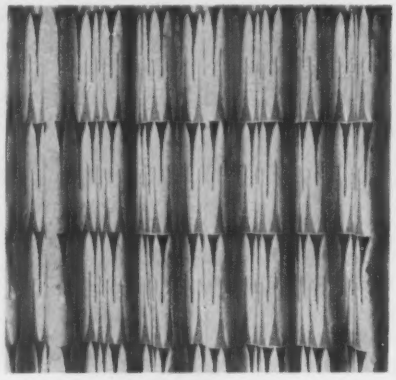
fabric. Text discusses types of canvas —painted, coated, woven, and vat-dyed — and gives data on fastening and maintenance. Photographs and sketches show canvas used at windows, over patios, by poolside, as fencing, over walkways. Canvas Awning Institute, P.O. Box 9907, Memphis 12, Tenn.

On Free Data Card, Circle **224**

Cafeteria Counters

Revised catalog contains 40 pages of information for selecting and specifying cafeteria counters. The catalog is divided into two parts, one listing 30″-wide sectional units, the other listing 24″-wide units. Complete general and mechanical specifications are given, along with front-elevations, dimensional drawings, and roughing-in data. Floor plans are suggested. Southern Equipment Co., 4550 Gustine Ave., St. Louis 16, Mo.

On Free Data Card, Circle **225**



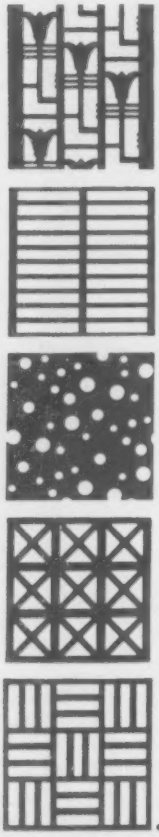
Drapery Fabrics and Contract Service

New catalog, 32 pages, shows 72 exclusive drapery designs (one shown by Pipsan Saarinen Swanson) by Raphael and describes its complete contract-drapery service. The brochure features illustrations of notable Raphael installations in buildings throughout the U.S., including examples of stage drapery selected from the firm's 2000 installations. Also featured in the catalog are several new fireproof and colorfast "Infinity" fabrics made of 100% saran. Edwin Raphael Co., Inc., 124 East 6th St., Holland, Mich.

On Free Data Card, Circle **226**

Complete Manual on Swimming-Pool Design

Publication has been announced of a 112-page swimming-pool *Design Manual* for architects, engineers, and pool and recreational consultants. In view of the need for specific data regarding the requirements of the A.A.U. and others, the complete requirements of the athletic groups have been included in the manual. Minimum standards of the National Swimming Pool Institute are also given. A number of typical pools and equipment installations are shown. Specifications sheets give all necessary data on pool equipment; in addition, written engineering specifi-



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Detail shows how dovetail extrusions (which mount on any centers) hold brackets at any desired height.
Tailored to fit any given open or closetted wall area. Smart in design and modern in "clear", "gold" deep etched anodized finishes and combinations. Quality built — closed-end aluminum tubing, rigidly held in cast aluminum brackets that are adjustable for height in dovetailed mounting extrusions. Brackets also adjustable to any desired centers.
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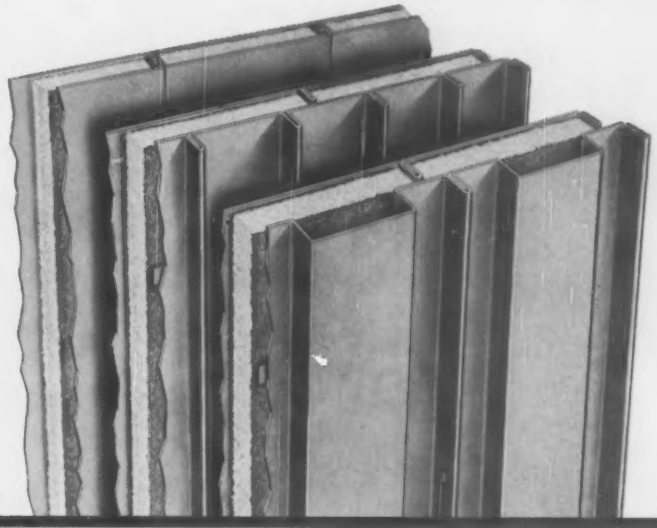

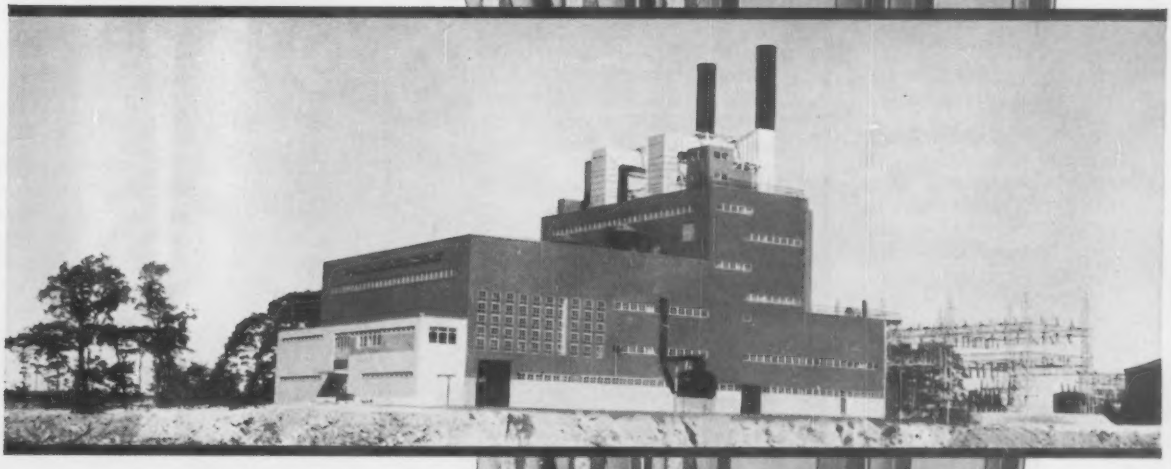

THE PROJECT

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A special 4-page section contains 46 actual color chips which show you the many colorful effects you can obtain in finished concrete products through proper use of iron and chromium oxide pigments as made by Williams. You'll also find a special section devoted to specific concrete color recommendations, and a section on how to determine final color. You will come to depend on this booklet as a prime reference source for concrete color information. Don't miss sending for your free copy. The supply is limited, so fill out and mail the coupon today.

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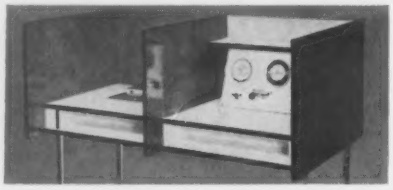
cations are provided. Paddock Pool Equipment Co., 14606 Arminta St., Van Nuys, Calif.

On Free Data Card, Circle **227**

Language Lab Equipment and Layout

Catalog, 8 pages, presents equipment for language laboratories, made by the company who "pioneered the language



laboratory system over 12 years ago." Various instructor's and student's units are illustrated, and the necessary planning data given. A typical 30-booth layout is shown, along with a wiring diagram for this installation. Monitor Language Laboratories, Division of Electronic Teaching Laboratories, Inc., 5034 Wisconsin Ave., N.W., Washington 16, D.C.

On Free Data Card, Circle **228**

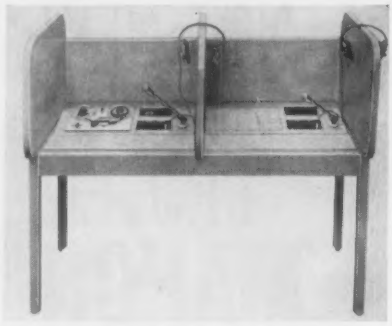
Laundry System Proves Advantageous

Economical, practical, and trouble-free are only a few of the advantages commending the UniMac laundry system to hospitals, nursing homes, schools, camps, hotels, restaurants, and industrial plants. Literature, a total of 40 pages, describes the company's various items of equipment (with full technical and price data, and specifications), cites case histories, gives list of installations, suggests layout of laundry areas. UniMac Co., 802 Miami Circle. N.E., Atlanta 5, Ga.

On Free Data Card, Circle **229**

New Student Booth for Language Lab

New student booth has been designed for the "Medallion Language Laboratory," after studies showed a trend toward greater use of the "audio-active-compare" situation than had been anticipated. The new booth is easier for the student to operate at this important stage of learning, is also more functional when equipped for "audio-active" or "audio-passive" study situa-



tions than the former booth design. Booths are available in 1- and 2-position styles, to be easily joined together in odd- or even-numbered rows. Brochure, 4 pages, describes the units and their functioning. DuKane Corp., St. Charles, Ill.

On Free Data Card, Circle **230**

Guide to Better Projection

Audio-Visual Guide to Better Projection, 36 pages, stresses the importance of proper planning and use of visual aids in the classroom and in business. It covers the history, purposes, and science of projection. Two main sec-

tions are entitled "The Environment of Projection" and "The Tools of Good Projection." Among subjects discussed are arrangement and shape of rooms, variations of lens focal lengths, rear projection, correct screen size, aspects of motion or still projection, lighting, seating, sound. Author of the guide is Dr. Irene F. Cypher, Associate Professor, School of Education, New York University. Radiant Manufacturing Co., 8220 N. Austin Ave., Morton Grove, Ill.

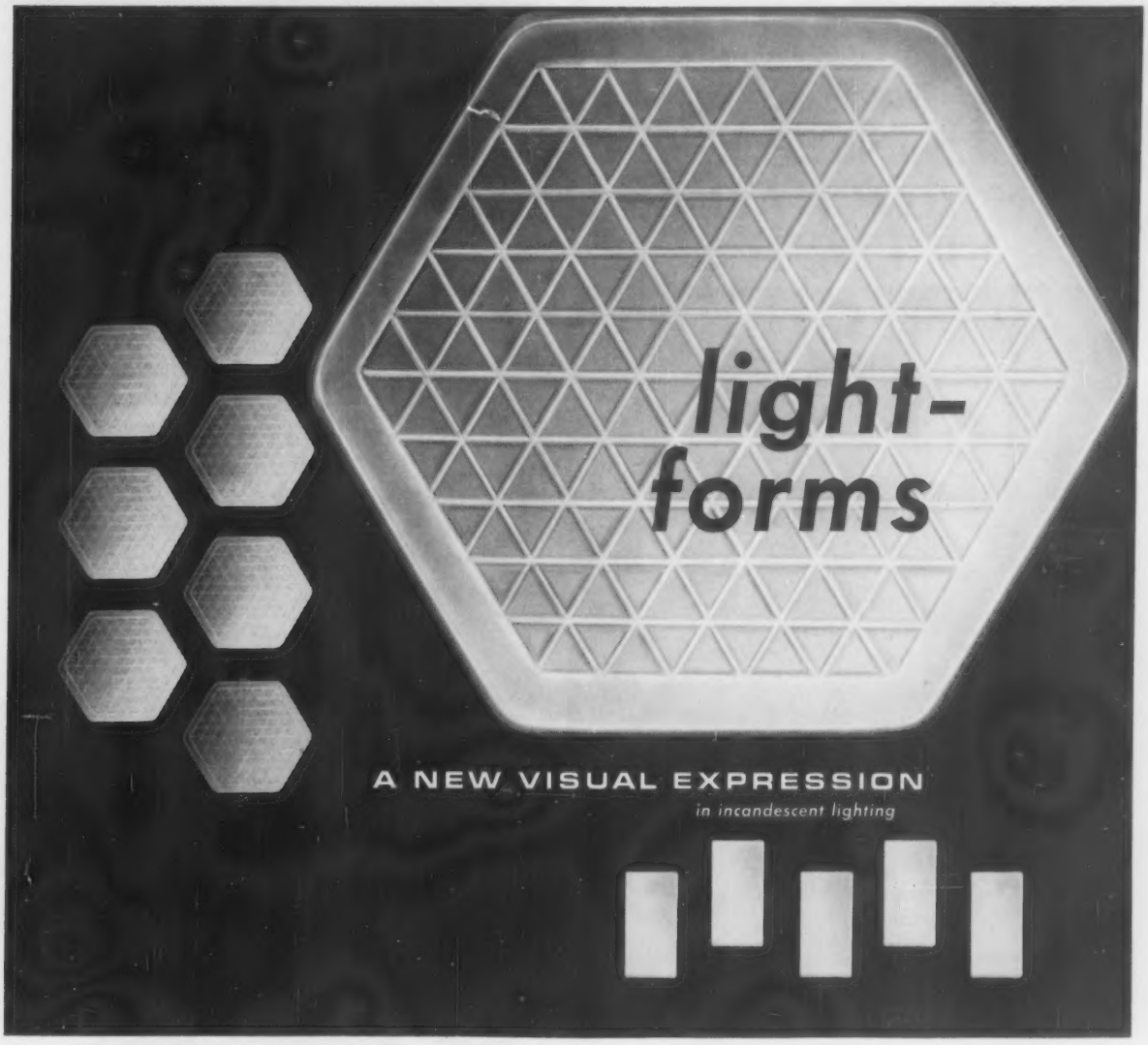
On Free Data Card, Circle **231**

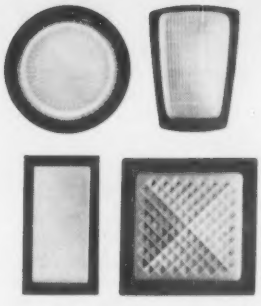
PROGRESSIVE ARCHITECTURE NEWS REPORT

REINHOLD PUBLISHING CORPORATION

430 PARK AVENUE NEW YORK 22, N.Y.

Publisher.....D. Bradford Wilkin
Editor.....Thomas H. Creighton
News Editor.....James T. Burns, Jr.





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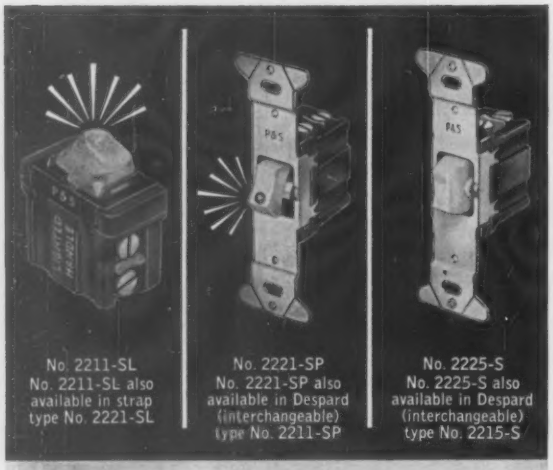

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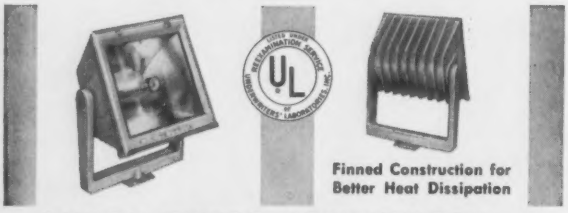

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The proven insulation benefits of FOAMGLAS are available now in a special 2′ x 4′ unit, a board size that speeds roofing installation and cuts labor costs.

The qualities of FOAMGLAS—moistureproof, vaporproof, strong, rigid, dimensionally stable, incombustible—are retained in this new package that makes it faster and easier to handle on the job. Multiple sections of FOAMGLAS are sandwiched between a special asphalt-laminated paper.

New FOAMGLAS-BOARD reduces the number of insulation joints on a roof. It is easily cut and shaped on the job to provide a tight fit around drains, vents or other obstructions.

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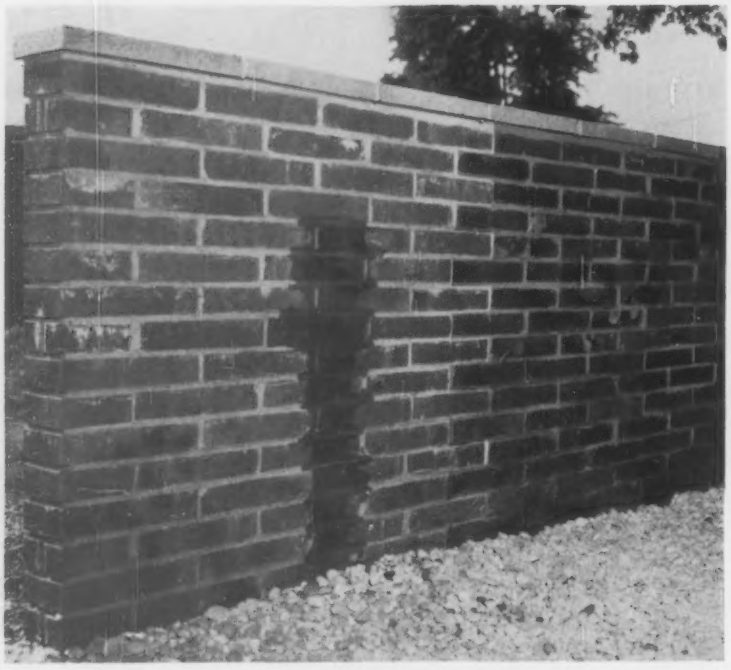
PITTSBURGH PC CORNING

NEWS from Dow Corning

How to keep water out



Silaneal strengthens mortar bond; helps prevent leaky walls

See what happens when a brick wall is laid dry with high suction rate brick. That dark area indicates severe leakage. Now, look further along the wall to the right. No wetness here. Why? Because that half of the wall was built of the same brick, plant-treated with Silaneal®. Here's the story.

The wall was built of high suction brick — a 6″ SCR brick with a 31 gram suction rate. The brick used in the right hand half had been treated with Silaneal, the sodium siliconate treatment that controls suction rate. In this instance, suction rate for the treated brick was reduced to below 20 grams. The brick in the left half were left untreated.

Here's the test. After brick was laid up and mortar properly cured, two streams of water — simulating wind-driven rain — were directed against the wall, one against each half. *In only two minutes*, water had penetrated the untreated section and was soon trickling down the other side. But after seven hours of this continuous soaking, the Silaneal treated section still showed no sign of leaking!

Walls are stronger. How well mortar does its job depends on its quality and how it cures. And to cure correctly and bond securely, mortar must hydrate slowly, thoroughly. A high suction brick, laid on fresh mortar, immediately draws much of the moisture from the mortar, which results in shrinkage cracks at the brick-mortar interface. But Silaneal controls this suction, slows it, allows mortar to cure properly and bond as it should. In the test above, for example, untreated sections gave a wall strength of 63 lb./sq. ft., while Silaneal treated sections reached a strength of 83 lb./sq. ft.

Brick stays clean. Dirt that falls on high absorption brick is pulled into the brick with the first rain. Silaneal makes the brick surface water repellent so dirt washes away with rain. And when water can't get into the brick, efflorescence is minimized. Clean-up after brick is laid seldom requires more than just simple brushing. And maintenance is reduced because mortar doesn't crumble. Equally important: brick are left free to "breathe" because Silaneal does not fill the pores in the brick and obstruct passage of air.

You can be sure your designs will be stronger, leak-resistant and more attractive by *specifying* that high suction brick be plant-treated with Silaneal to reduce suction rate to the 10 - 20 gram level. For more information about this new building aid and a list of manufacturers now supplying Silaneal-treated brick — write Department 6823.

SILANEAL®
keeps brick clean

Dow Corning CORPORATION
MIDLAND, MICHIGAN

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For more information, circle No. 393 ▶

A small conference room emphasizes the space-saving feature of 2″ thick Weldwood Movable Walls compared to the 6″ thickness of fixed paneling on masonry.

General office area, with Weldwood Movable Walls. Front: teak. Rear: covering of red silk and rayon.

These wood paneled walls at Chase Manhattan can be as permanent as they look . . . or . . .

they can be moved overnight if floor plans ever need changing

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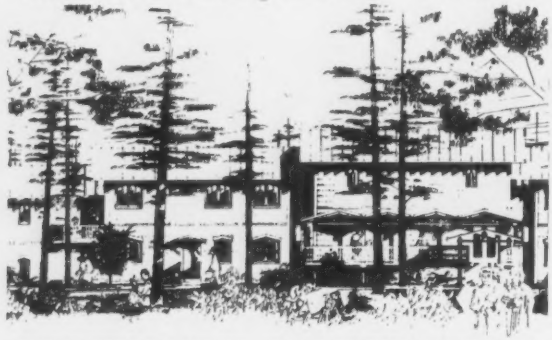

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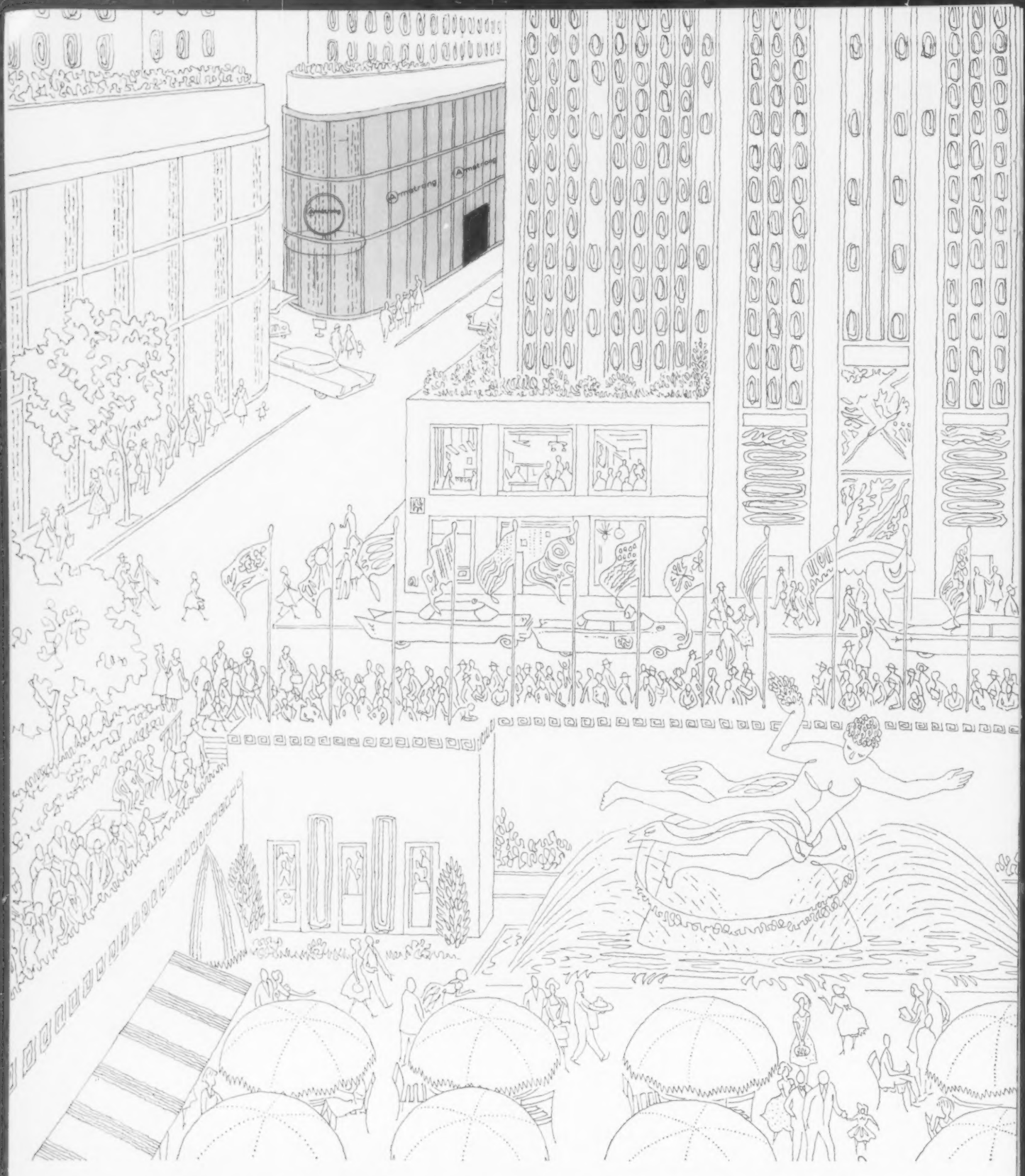

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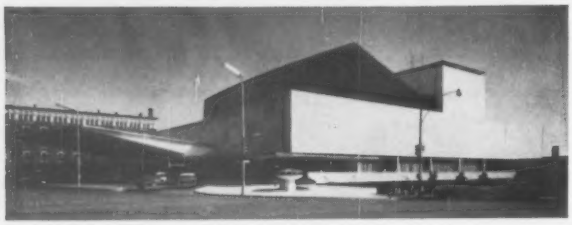

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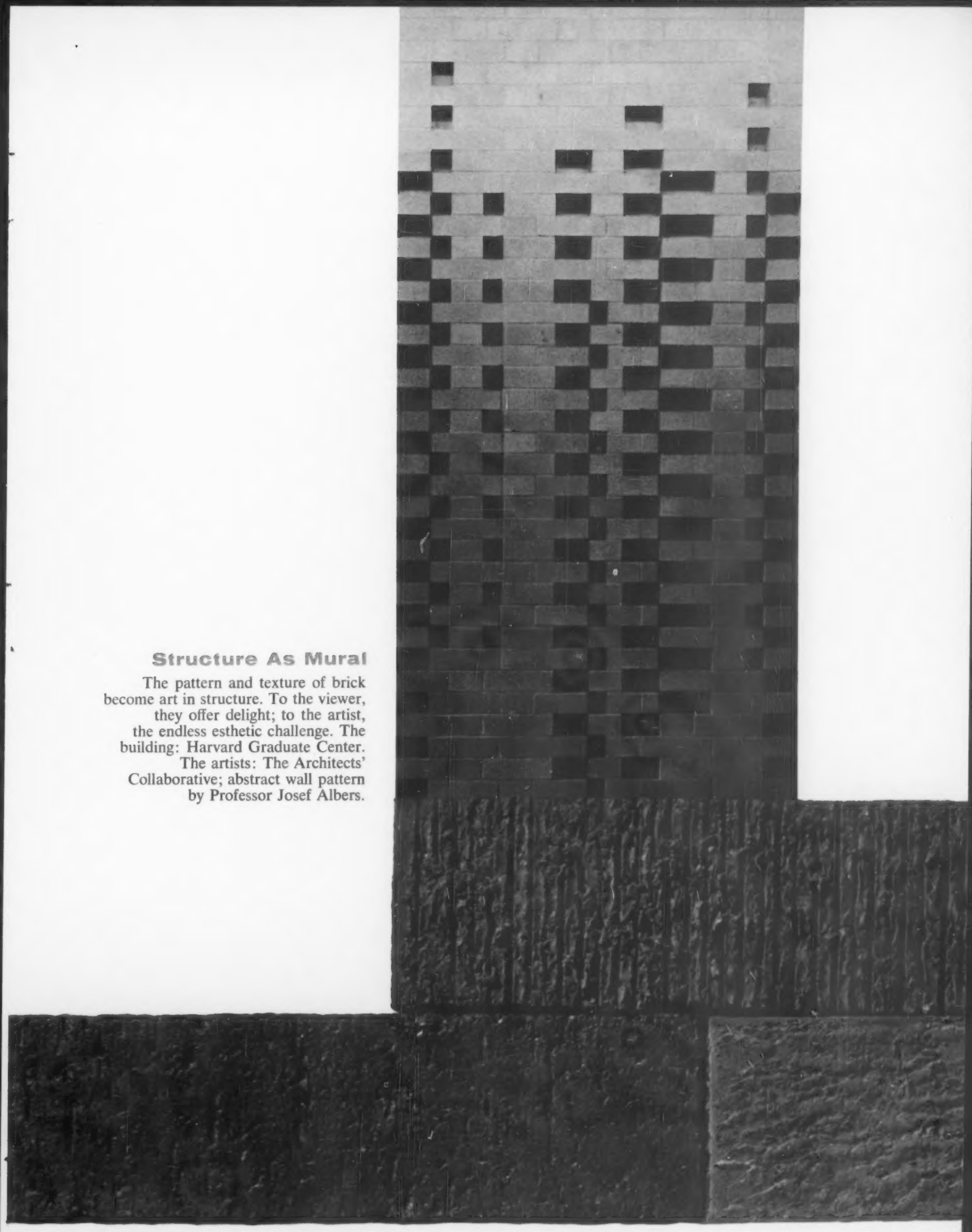

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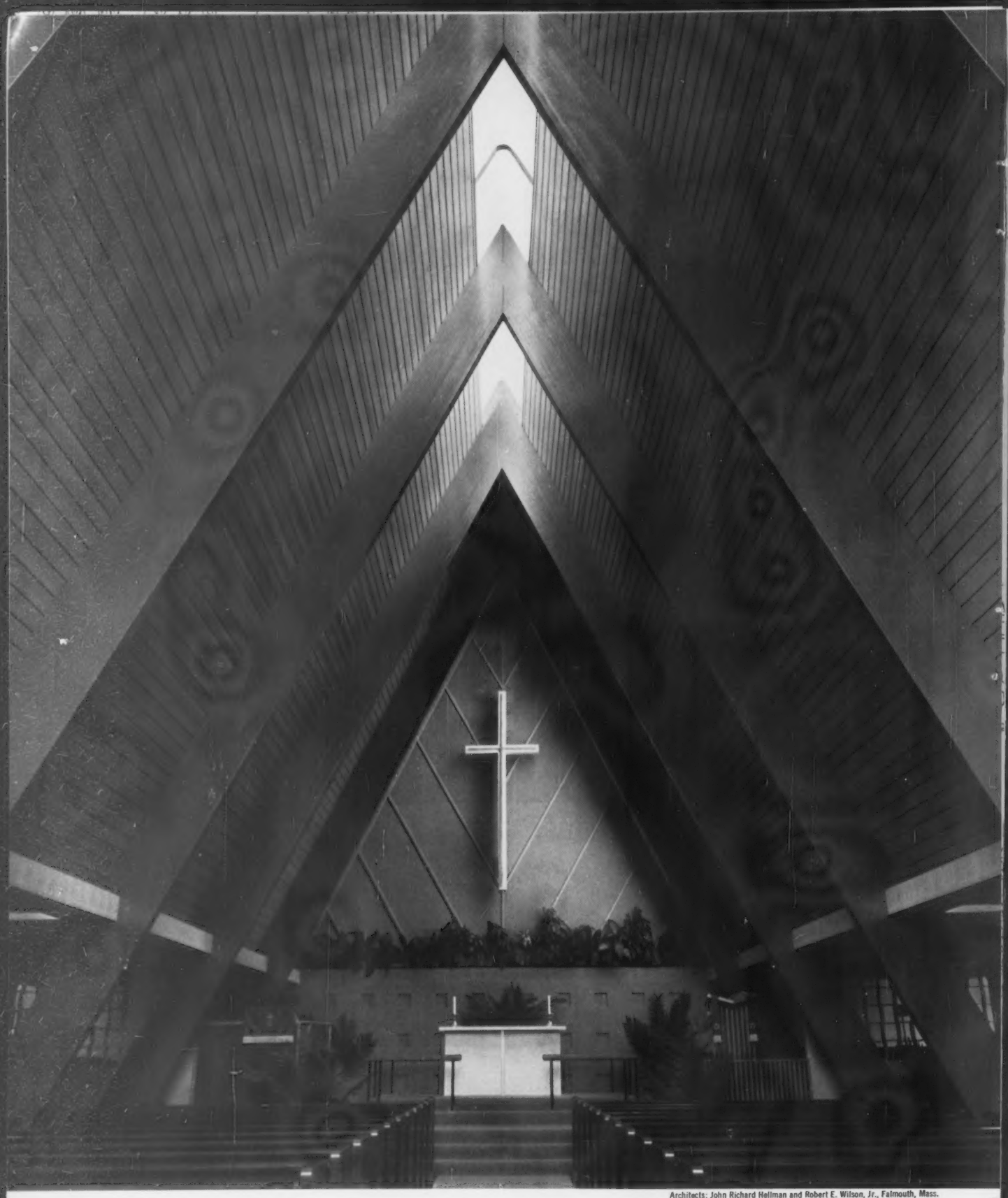

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Photo: G. Gherardi-A. Fiorelli

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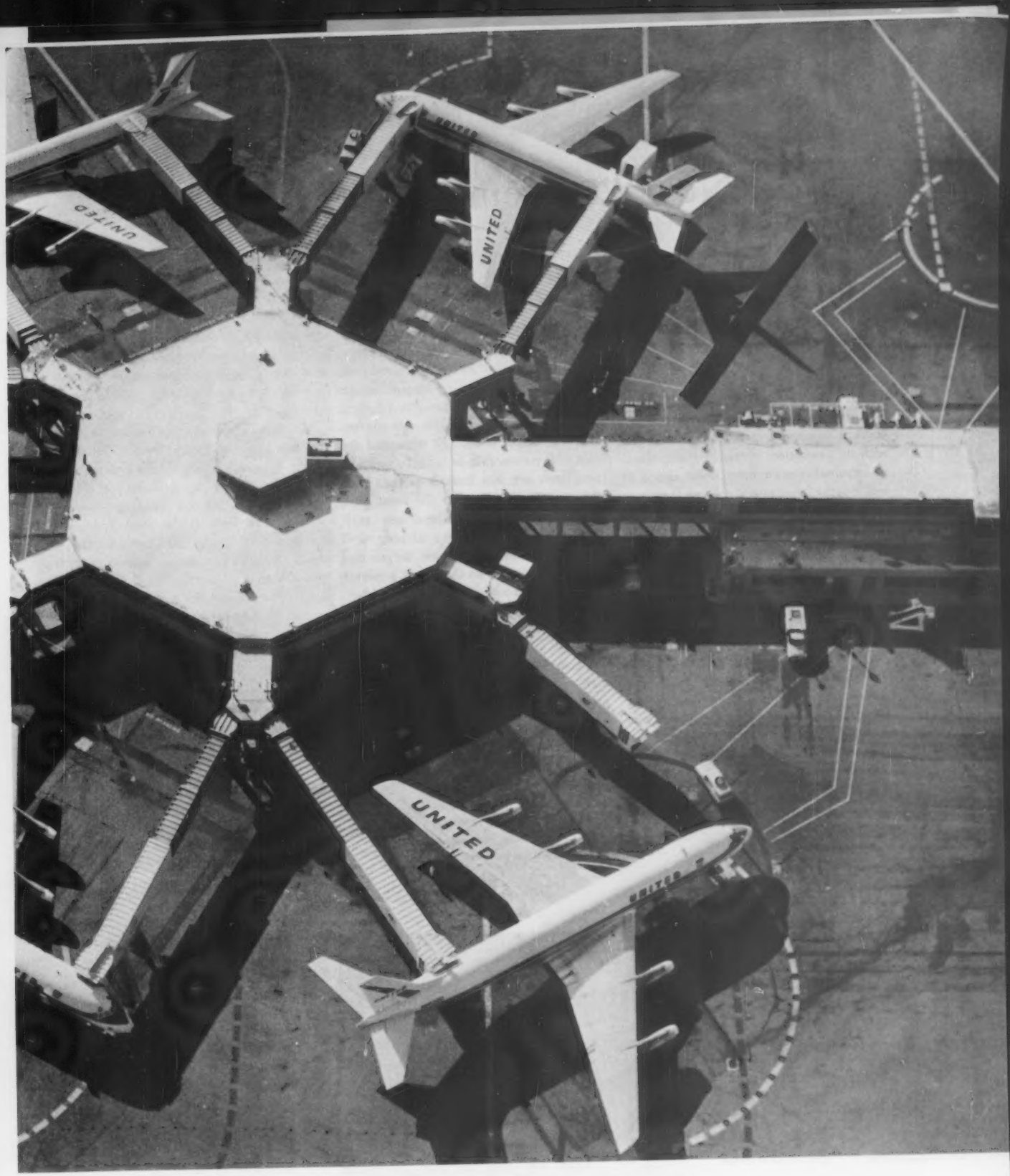
Courtesy United Air Lines

The introduction of commercial jet aircraft in 1958 and the continued growth of air travel since that time have produced major changes in air terminal design. As the speed and luxury of travel by air have increased, the need for greater efficiency and comfort within the terminal has become apparent.

In the newer air terminals, the passenger has no stairs or ramps to climb and is protected from the sound and fumes of the jet engines; his baggage is efficiently transported on high-speed conveyors. As planes have grown larger and the number to be accommodated has increased, new conceptions in the plan of terminals, such as the decentralized scheme and the tunnel-and-satellite plan, have been evolved.

The effect of these developments on air terminal design will be the topic of the following pages. After an introductory discussion, four major jet terminals, chosen for their architectural distinction, will be shown. An outstanding example of the many smaller terminals now being built and a study of over-all planning for a major international airport will round out the subject.

Air Terminals for



Jet Travel

New Problems and Trends

BY JOHN MORRIS DIXON

The function of an airport terminal building is to transfer passengers and baggage from surface vehicles to designated aircraft. The principal obstacle to this movement is the airplane itself: the space it requires and the noise and fumes it produces. Another major problem is the weather, which can delay departures or make it inconvenient to board the plane without protection. Recent developments in terminal design have been aimed at making the passengers' trip to the place as short and comfortable as possible and their stay in the terminal, however prolonged, enjoyable.

The design program of an air terminal depends on several variable factors: the volume of passengers and the percentage of them who are originating, terminating, in transit, or transferring; the expected range of flights, which largely determines the volume of baggage and the number of visitors accompanying or meeting passengers; the distribution of traffic volume over a period of time; the type of aircraft and their mode of operation on the apron; the severity of the weather; and probable requirements for expansion.

The recent establishment and constant expansion of commercial jet service has profoundly affected air terminal design. Before commercial jets were introduced, their anticipated effect on airport design was widely discussed; there was a feeling among architects that people and conventional structures could not withstand the blast of these aircraft. In actual operation, the planes are less hazardous than they were assumed to be. For the most part, they differ from propeller-driven craft only in degree, following already well established trends. They are larger and harder to maneuver on the apron, generate more noise and a stronger and hotter blast, and carry more passengers.

The most distinct characteristic of their operation is an economic one: because of the cost incurred for any period these multimillion-dollar craft spend on the ground, they are not often returned to the hangar. Instead, the extensive routine servicing they require is done on the apron simultaneously with the unloading and loading of passengers and baggage. Although the use of underground connections for fuel, water, electricity, and air conditioning is increasing, the congestion of trucks and personnel around the aircraft has precipitated the development of devices for protected passenger access above the apron level.

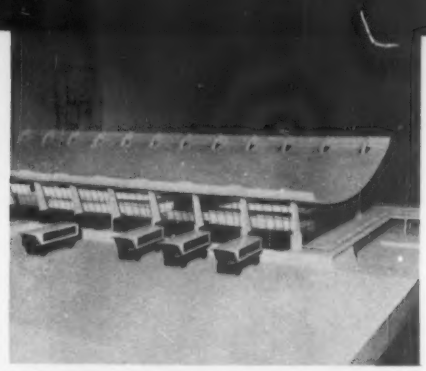
Adjustable second-level loading bridges are now in use at several major terminals. Their design depends on the type of aircraft served and the parking procedure used, factors which are standard for each airline. The light-weight steel "jetway" developed for United Air Lines extends to a length of 107 feet to serve planes parked parallel to the loading finger. It is operated by a passenger agent and can be moved to the plane from its stowed position alongside the building in one minute. A shorter cantilevered bridge that is used by several other airlines is less expensive, but requires a "nose-in" parking position, from which planes cannot leave under their own power.

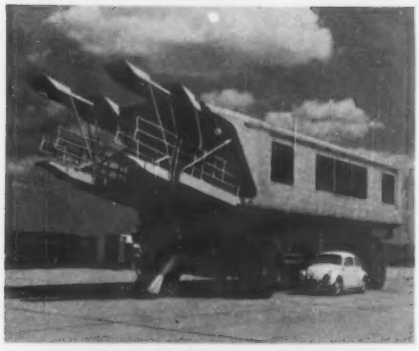
Long before the advent of jet planes, the "finger" plan, with boarding gates

Courtesy United Air Lines

Courtesy American Air Lines

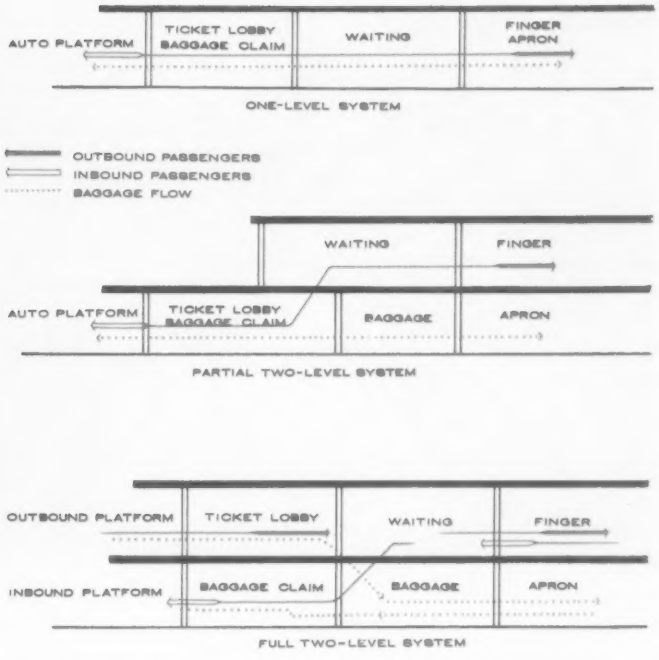
Enclosed adjustable loading bridges (dubbed "jetways" by the airlines) permit passengers to enter planes with no change in level, protected from weather and apron hazards. A system developed for United Air Lines (far left *and* preceding pages) *uses two long telescoping bridges for each plane. The single, shorter bridge used by American Airlines* (left) *leads to the forward door of the plane.*



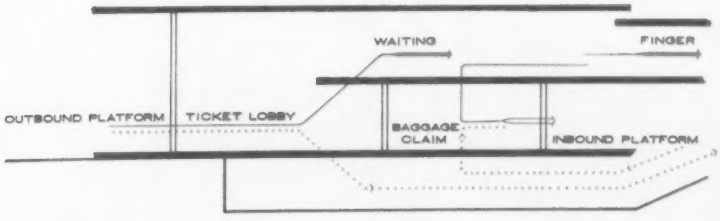


Courtesy Federal Aviation Agency

Mobile lounges for the Dulles International Airport (top) *can be coupled to the terminal at one end; the other end has folding ramps for access to planes* (middle); *luxurious interior* (bottom) *holds 90 passengers.*



Several basic circulation systems have been developed to facilitate the flow of passengers and baggage through the terminal. The one-level system (top) *is suitable only for the small terminal; the partial two-level system* (middle) *has passenger and baggage traffic on separate levels; the full two-level system* (bottom) *separates inbound passengers from outbound.*



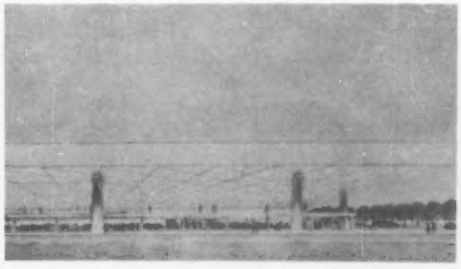
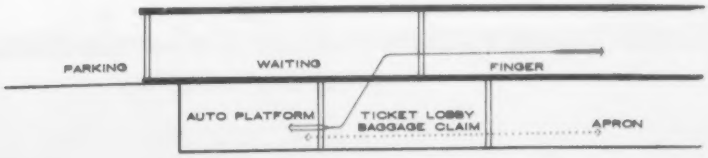


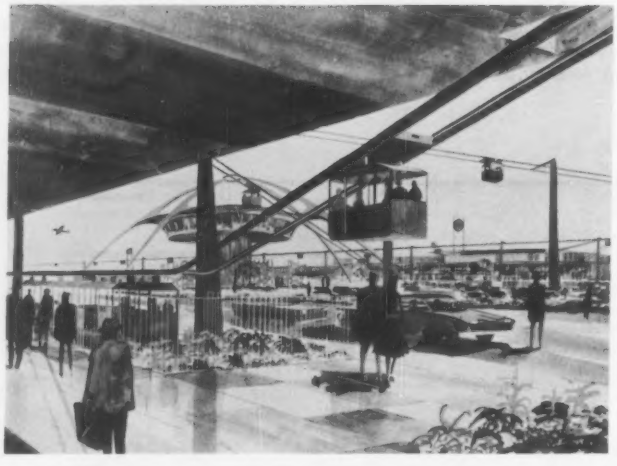
Photo of rendering: Lee Gillette

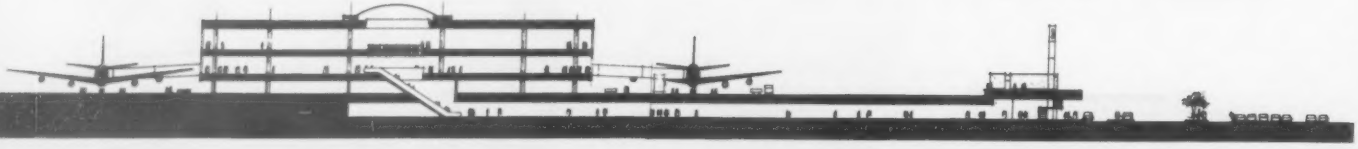
Two departures from the basic circulation systems: the winner of a competition for a new terminal at New York International Airport (above), *by I. M. Pei, with a vehicular ramp for inbound passengers on the field side; a terminal for the Tulsa Municipal Airport* (below), *by Murray-Jones-Murray, with waiting area and concessions removed from direct passenger routes.*



Courtesy United Air Lines

The tunnel-and-satellite scheme is one method of isolating the passenger from apron activities. The preliminary design for an airport at Kansas City, Missouri, by Cooper, Robison & Carlson, illustrates this concept. The new International Airport under construction at Los Angeles (right *and* below; *Charles Luckman Associates, Welton Becket & Associates, and Paul R. Williams & Associates, Architects*) *comprises six unit terminals with satellites. An electronically controlled horizontal elevator ("the last word in modern vehicular systems") will connect the terminals.*





SATELLITE BUILDING

TICKETING BUILDING

located along projecting concourses, was introduced to accommodate the increasing number and size of planes at the terminal. More recently, the "tunnel-and-satellite" concept has been developed to free the apron of the obstructions and permit more compact parking patterns. Both of these systems, however, involve long walks between surface transportation and plane positions. The mean walking distance between vehicle and aircraft at the Dallas airport terminal, for instance, is 1350 feet.

The most effective method yet developed for reducing walking distances in large terminals is the use of surface vehicles to carry passengers to the plane. Buses have been used for years at large airports abroad. At several cities, KLM Royal Dutch Airlines operates special low-floor, tractor-drawn buses, which are more maneuverable and more convenient for the passenger than conventional ones.

The special "mobile lounge" now being built for the Dulles International Airport near Washington, D.C., by Eero Saarinen & Associates, will carry up to 90 passengers from the terminal to a plane parked as far as a mile away. The planes can be parked in the most convenient way for servicing and the terminal can be relatively compact. Although this airport will be one of the world's largest, with 60 jet aircraft positions in the initial stage, the mean walking distance for the passenger will be only 350 feet, approximately that of a conventional finger-plan terminal accommodating six planes. Eventually, however, the Dulles terminal will need loading positions for 15 smaller feeder-line and executive aircraft, which cannot be serviced by mobile lounges; the finger structure proposed for them will require a mean walking distance of 1150 feet.

Mechanical baggage-handling systems have been developed as a result of the competition among airlines in the speed of passenger handling. The larger jet planes are designed to carry baggage in "pods" which can be unloaded onto tractor-drawn cradles. High-speed conveyors can then carry the baggage through the terminal at speeds as high as 300 ft per minute; the passenger may actually find his suitcase waiting for him when he reaches the claim area.

Systems for efficient traffic circulation within the terminal have evolved as the volume of traffic and the number of passengers per plane have increased. Circulation of passengers and baggage on separate levels has been necessary to avoid overextended traffic routes and to permit use of mechanical baggage-handling systems and second-level passenger loading bridges. In the larger terminals, separation of inbound and outbound passenger traffic has proved advantageous. This system works best with arriving and departing vehicular access on separate levels.

The loading and unloading of the aircraft can be made more efficient by the use of "hold rooms," which are individual waiting rooms for each flight located at the boarding gate. Outbound passengers' credentials can be checked at the entrance to the room, eliminating delays at the gate itself; inbound and outbound traffic can be effectively separated.

Every commercial air terminal is basically a business enterprise, although usually government-owned. Aside from the necessary provisions for passenger services, it must include space for concessions, some of which meet passenger needs and some of which take advantage of the value of the airport as a public attraction. The most favorable position for concessions is directly on the passenger's route to the plane; adequate rental space in favorable locations must be provided without extending circulation routes.

The interior of the terminal must be protected from the noise and fumes of the jet engines. Most large terminals built today are air conditioned and sealed against infiltration: air supply is generally drawn from the side of the terminal away from the apron.

Noise control requirements vary within the terminal. The sound of the jet as it starts to taxi, about 112 db at the source, must be reduced to 40–50 db at ticket counters or offices, but may be as high as 55 db in waiting or dining areas and 80 db in baggage claim areas. The peak sound is never of long duration (usually 10 to 20 seconds), and acoustical requirements depend in part on how often it occurs. In terminals which will handle only one or two jet flights per day, those inside the building can be expected to tolerate the noise.

The familiar glass wall overlooking the apron has not been eliminated by the introduction of jets, but it must now be of ½-in. glass, carefully detailed to prevent infiltration of sound or air. The strength of this glass permits larger areas between supports — creating an appearance of greater openness—than if thinner glass were used.

The concept of the decentralized airport, where each airline operates a complete passenger facility, has been applied at several major air hubs to reduce the terminal to manageable scale for the passenger. The individual airlines may be housed in sections of one long building, or, as at New York International Airport, in separate unit terminal buildings. In any case, the airline is able to establish the type of service and the kind of atmosphere it feels will satisfy its patrons.

The principal criticism of this system is that, while it is convenient for the passenger using one airline, it makes transfers between airlines especially difficult, often requiring trips by taxi or bus between unit terminals. At the large airports where the system has been applied, the proportion of originating and terminating passengers is unusually high; at New York International, for instance, only five per cent of the passengers transfer between lines.

The International Airport now under construction at Los Angeles comprises a group of unit terminals of standard design, each with a ticketing building facing the central parking lot and a satellite located on the apron. The passenger enters the ticketing building 14 feet below apron level and proceeds through a 400-ft tunnel to the satellite, where he is carried up two floors by an escalator to the level of the adjustable loading bridges.

The predicted growth of air transportation, and the prospect of even larger aircraft, make planning for expansion and alteration an important factor in air terminal design. Expansion may involve the addition of identical bays or of self-contained subterminals, but in any case the original building must be designed to accept additions with a minimum of demolition. The likelihood of alterations should be considered in the design of loading fingers, bridges, hold rooms and other facilities directly related to the plane itself.

The Federal Aviation Agency recommends that the first construction stage of new terminals be designed to handle anticipated needs for the next ten years; plans for expansion in the succeeding years should be flexible, to allow for possible radical changes in aircraft design.

Choosing a Terminal Plan

At this year's Design Awards Seminars in Minneapolis, architect Roy Harrover of Mann & Harrover presented a discussion of the firm's citation-winning design for the Memphis Municipal Airport Terminal (p. 112, JANUARY 1961 P/A), *which is now under construction. His account of the comparative study of planning concepts that was prepared in the initial stage of design is presented below.*

Memphis is a city of 500,000 population, and serves a "market area" of about 2,750,000. At the time the study was undertaken, in 1958, the airport had an emplaning passenger volume of 379,500; the design was based on an assumed volume of 768,000 for the year 1970. Traffic statistics indicated that the terminal should provide 22 to 24 gate positions in the initial stage, and be able to accommodate planes of all sizes up to medium-range jets in regular service and larger jets on occasion. Although the discussion specifically involves the problems of the Memphis Airport, it reveals many interesting points about present-day air terminal design.

When Bill Mann and I got this project, we knew virtually nothing about aviation; so we decided that the first thing for us to do was to school ourselves in aviation. Now this was in 1958, about the time that the first jet was being put in service in this country, the first *pure* jet. There were all sorts of feelings about what jets would do to the aviation industry and to terminal building design. So we set about to ferret out the truth from the myth of jets. We knew that this terminal building of ours would have to operate mostly with jet aircraft during its future life. We studied terminal buildings themselves; we studied plans of terminal buildings; we talked to people in the aviation industry; we discussed the problems of jet aircraft with aeronautical engineers—to try to find out what the impact of jets would be on building design.

As we looked around, we perceived that there were five basic terminal building concepts that had validity. We decided, in order to make up our own minds, that we would attempt to do a scheme that would fit Memphis based on each of these concepts. We would then have each of the schemes exactly the right size under those exact conditions; and we could discuss them with the airport commission, a tremendously interested group of informed men who would ultimately make the decision on the type of scheme that we would use.

In other words, we did not intuitively arrive at a scheme. In fact, if we had started intuitively, we might have had a bus scheme, because this was exciting to us and also to some of the airport commissioners. Or we might have had the tunnel-and-satellite scheme, in which the passenger goes through a tunnel under the apron and comes up in a remote satellite from around which the aircraft depart. These schemes both had terrific appeal for us as architects. However, we decided to try the five basic concepts that we saw existing; we felt that, with a few exceptions, almost every airport in the country, every airport in the world, would be a variation of one of these five basic concepts.

Scheme A is a one-level building; it sits right on the ground. Somewhere you have to separate vertically the flow of the passenger and the flow of the service, and it's always done either by ramping the passenger up, as has been done in Dallas, usually with a moving sidewalk, or by ramping the baggage down—or by a bit of both.

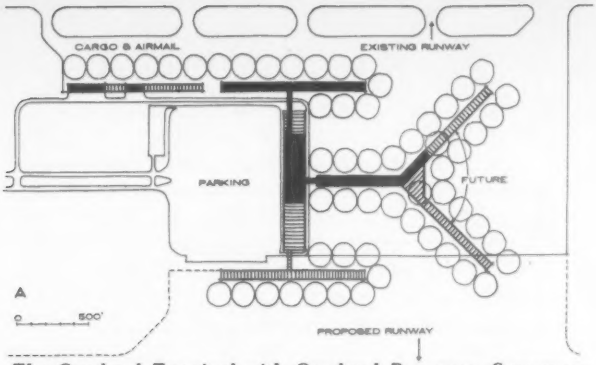
Looking at the plan of this type of building, you find it always resolves itself, and almost has to, into two wings. A wing for the airline ticketing offices and baggage room on one side and one for the baggage claim on the other. This means that as the building grows in the future, and as additions to it are made, one end must grow out with more and more ticketing counter, the other end must grow out with more and more claim counter. And yet, to go to the plane, the passenger has to go back to the middle, so he frequently finds himself in the position of getting his ticket at one extreme end, coming to the center of the scheme, and then going all the way back, out on the ramp, to his aircraft. This, we thought, was a rather inefficient plan. It puts the passenger right at apron level and it makes it extremely difficult to board jets without crossing the apron.

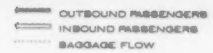
The B plan, which is the bus scheme that we developed for Memphis, is also a one-story scheme. The passenger comes in at the automobile entrance, tickets, goes through the shopping area and the waiting area, enters a lounge, and boards a bus at the rear. In the case of Memphis, we could not justify the mobile lounge for reasons of economics; in a bus scheme here we had to use the standard city-type bus. Mobile lounges cost $100,000 apiece. You have to have approximately as many mobile lounges as you have gate positions; in our case, that would have been twenty-odd buses, and we just could not afford the expense of them.

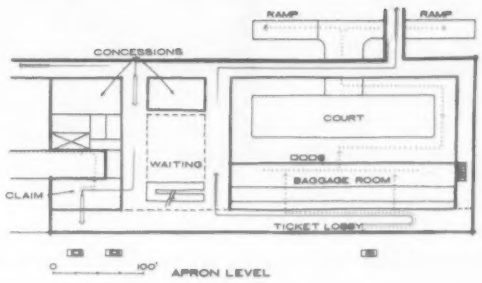
The plan — again rather efficient — is more or less like Saarinen's Dulles International, except on a much smaller scale, of course. You have the passenger entering on the upper level, going through the ticket offices, through the shopping areas, and into the departure lounges at the rear. The bus picks the passenger up at the departure lounge and carries him to the aircraft. He unloads on a bus back from the aircraft, filters through the shopping areas again, past the claim counter, and out at the front to transportation.

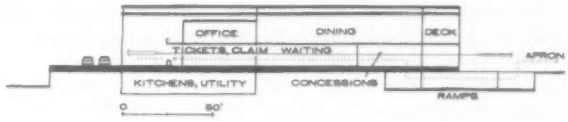
There would be two smaller service buildings out in the middle of the apron, and the aircraft parked in an orderly pattern out in the apron. Now, this scheme seemed rather good in theory until we got into it; we found that it will work only at a point of origin or destination, such as a coastal city—Washington, New York, or San Francisco—because if a passenger is going through the city and stays on the airplane, he does not have time to go to the terminal building and back to the airplane on these buses. Therefore, he has to remain on the airplane, on the apron, during the 15- or 20-minute wait between landing and take-off at an intermediate city.

The airlines say, "We've got to drive much too far to service these aircraft from any building; we need a building close to every aircraft." It was opposed by all of

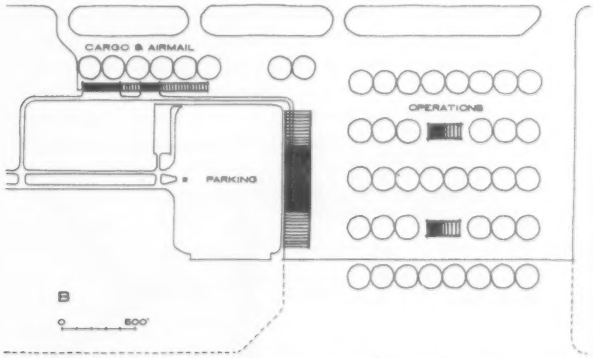


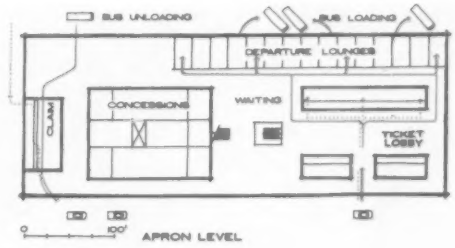


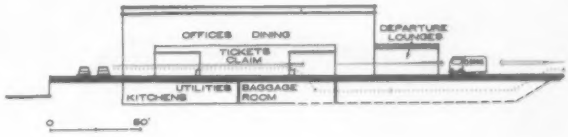




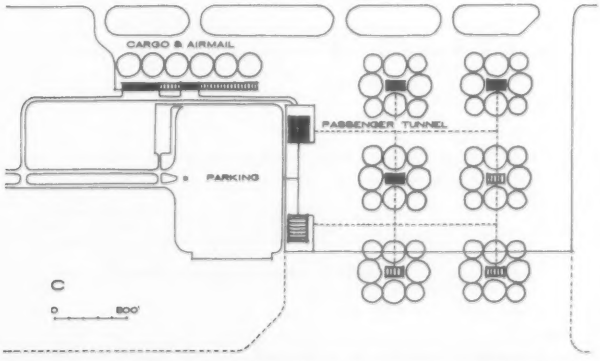
The One-level Terminal with One-level Passenger Concourse, *which has been built in many small cities, causes the passenger to walk great distances. The simplicity of the arrangement allows the small airlines to operate with a minimum of personnel. On the other hand, it makes no provision for second-level loading by enclosed adjustable bridges, as desired by many of the larger airlines. It was agreed by the architects, the airport commission, and the trunk airlines serving Memphis, that for larger cities this type of building would soon become a thing of the past.*

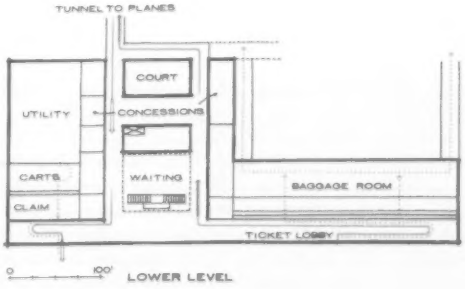




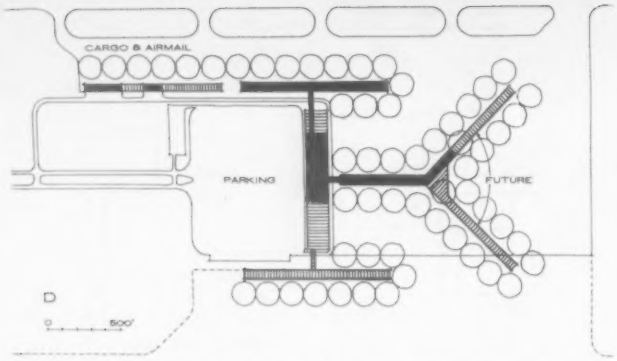


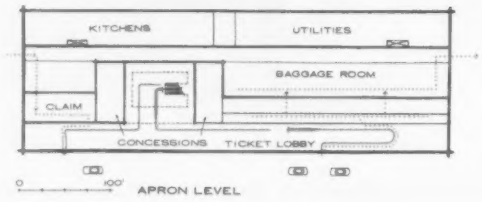
The Bus Scheme, *using either conventional buses or mobile lounges, has the advantage of reducing walking distances for the passenger. At Memphis, however, the excessively long distances of some major terminals would be unlikely. Moreover, conventional loading positions for small planes would still be required. Potential economies in building would be outweighed by the additional costs of drivers' salaries, bus maintenance, and insurance. The architects concluded that this solution, while it appeared suitable for a major international air hub, would not be appropriate for the Memphis terminal in its first stage of development.*

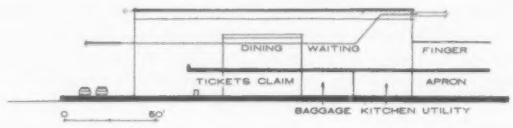




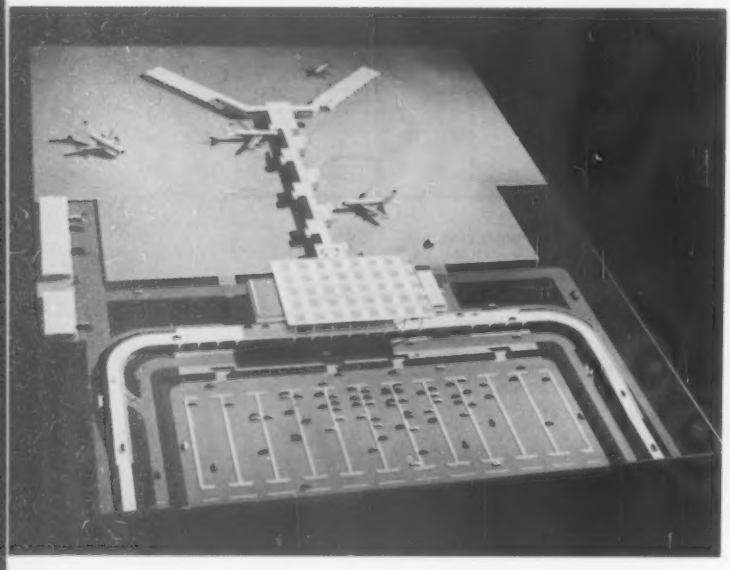
The Tunnel-and-Satellite Scheme *includes separate loading buildings out on the apron that are reached by tunnels. This solution effectively separates passengers from aircraft activity, but subjects them to long walking distances with no visual relief. The scheme readily permits modular expansion, but at Memphis the runway arrangement would necessitate a double row of satellites, with extreme walking distances and a confused pattern of circulation. Moreover, the high proportion of passengers transferring between trunk and feeder airlines at Memphis makes any kind of decentralization inadvisable.*

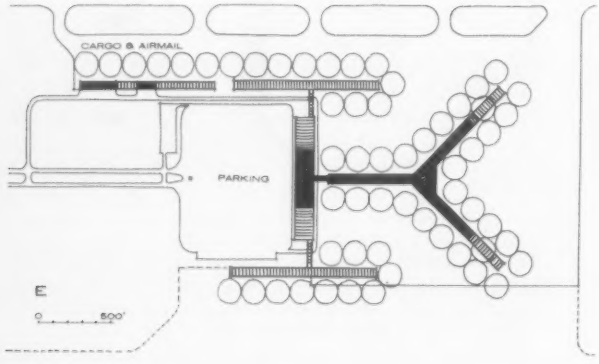


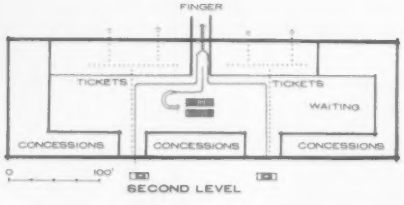


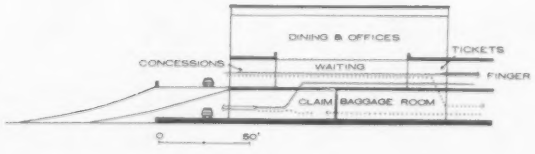


The Modified Two-Level Terminal *was never favored by the architects or management, but was supported briefly by the airlines as a possible compromise between the needs of the different airlines using the terminal. The scheme satisfied the desire of the small feeder airlines to keep all airline operations on one level, yet permitted second-level loading to meet the needs of the larger jet carriers. Its main disadvantage was that it placed ticket counters and passenger waiting areas on different levels, making it difficult for the airlines to maintain effective control over passengers.*









The Full Two-Level Terminal, *while it involves the considerable additional cost of an automobile ramp, was felt by the architects, the airport consultants, and the airport commission to be the best solution for the present problem of the Memphis Airport and to provide the best opportunities for future expansion. The Y-shaped finger provides positions for larger jet aircraft along the main two-story spine and for smaller planes along the two one-story branches. The scheme could easily be adapted to a system of mobile lounges, which could load at the second level, either at the base of the original finger or at future subterminal additions; thus the question of introducing mobile lounges is reduced to one of convenience and economics, rather than planning. The terminal building was conceived as a large hall, with the public facilities of the third level forming a mezzanine around it. The roof, made up of 40 identical concrete h-p "umbrellas," was chosen as an economical solution; the impression of lift is produced without imitating the lines of planes or birds. The problem of relating the second-level automobile ramp to the form of the building was handled by setting the ramp back within the first row of columns and by establishing a clear horizontal line at this level around the entire building. For other illustrations and plans,* *see p. 112,* JANUARY 1961 P/A.

the eight airlines that we were dealing with. They all were familiar with Saarinen's scheme; most of them had argued with Saarinen, and most of them are opposed to the Washington scheme, although they admit it would probably work better at Washington. They had said, "All right, we'll try this at Washington, but until the results of it come through, until it's been in operation for two or three years at least, we're not going to do another one anywhere." So it was pretty much out of the question.

Scheme C is the tunnel-and-satellite scheme. We were on a slight hillside, which gave us the opportunity of burying the building, with the front exposed and the rear in the ground. So actually the basic working portion of the lobby would be beneath the apron level. You come in to the front of the building, ticket, wait, and so forth, then go through tunnels, and come up out on the apron to the aircraft.

This seemed a good thing: it gets the passenger totally away from the blast, the dirt, the noise, the confusion, the actual danger of being on the apron or crossing over apron traffic. And yet somehow it seemed to us that it was wrong. Was this problem so tough—this problem of jets and all the attendant factors—that we really had to bury people Buck Rogers fashion? We didn't think so.

Somehow it didn't seem right to go underground and through a tunnel and suddenly come up into the air. It seemed to us that it would be better to be in a building above ground, to get some of the spectacle of apron activity, and not to feel that you were burrowing in order to fly. This scheme actually had very few supporters after all the problems were washed out.

The D scheme: this was, right after the war, the most popular way of building an airport. It's an old work-horse plan. It has had some face-lifting in its day; Saarinen's TWA terminal at Idlewild is based on this general concept.

In this scheme, you have your automobile traffic at the front of the building on the ground, both incoming and outgoing traffic. All of the passengers come in on the ground level; they ticket on the ground level; they leave their bags there, and the bags go straight back out through the baggage rooms to the aircraft on the ground level. But after having dropped his bag and ticketed, the passenger goes up an escalator to the second floor. You can see a good version of this at Idlewild now —the United terminal. You go up to the second floor where the waiting rooms are, and you go out a second-level concourse to the aircraft.

There's one problem with this that the airlines did not particularly like: the passenger is waiting on the second floor, and yet all the airline personnel are at the ticket counter on the ground floor. When the passenger becomes confused about his ticket, he has to come down from the second floor to ask for information; then he goes back up. He is remote, he feels left out, and the airlines in turn feel that they have somehow lost him. Now at United, they've tried a number of things: they've put an information clerk up on the second floor; they use closed-circuit television to keep in touch.

There was another basic problem. The traffic at the front entrance of the terminal buildings is becoming greater and greater, as we become more and more dependent on the automobile for all types of transportation. We felt that perhaps another scheme could bring more automobiles close to the building than this one did.

Now we come to the last scheme—the E scheme—in which you have an elevated automobile ramp in front of the terminal building. This means you separate your incoming and outgoing automobile traffic before it gets to the building. The passenger coming to the terminal building to go out on an aircraft goes up the auto ramp and immediately finds himself on the second level. The ticket counters and almost all of the passenger facilities are on the second-floor level. He tickets there; he drops his baggage there; he goes out to the plane on the second floor of a concourse; he boards the plane through an enclosed bridge from that second level; and from the time he steps down from his automobile until the time he sits down in his seat in the airplane he has not changed levels.

Coming back, he comes in on the second level from his airplane and enters the main lobby; he has a chance to shop there, goes down the escalator, picks up his bag on the ground level, and goes out on the ground level to transportation back to town. In other words, the automobiles are divided at the front of the building—the passengers are divided in the building—and generally it works much more smoothly.

This plan was favored by the major airlines in Memphis. We have a strange situation there: we have eight airlines. One of them has 42 per cent of our traffic—Delta. Another one has 27 per cent of our traffic —that's American. Together, they produce by far the majority of our traffic, and yet there are in addition six very small carriers.

Now the small carriers would prefer to work out of a one-level barn. Because of their low income, they'd like to have a small amount of overhead. They prefer that one man sell you a ticket, then take your baggage, then take the baggage back into the baggage room, and ultimately push it on a little hand-cart out to the airplane. So they were very much opposed to this type of plan, in which, once the baggage has been brought to the second floor, it has to be carried by a conveyor belt down to the ground floor baggage room, where it's picked up by motorized tug and taken out to the aircraft.

These conveyor belts that transport the baggage down through the building represented to the smaller air carriers a terrific amount of expense. And one other thing: it meant that they had to have personnel on the second floor, personnel in the baggage room below, and additional personnel out at the aircraft itself, on the apron.

The big airlines favored it; the small airlines didn't. The airport commission favored this scheme, although they knew that we'd have to spend quite a bit of money for the elevated auto ramp at the front of the building.

Let me point out that we decided to provide for 100 per cent expansion. In other words, we could double the size of the building in the future. The building was designed on projection of passenger traffic in Memphis in 1970. After 1970, it will become somewhat crowded. Then we will begin to add.

Our Y-shaped finger, which comes out at the rear of the building, is exactly the right size—and will always be exactly the right size—for the terminal we now have. Later, a subterminal will be added on the left of the building, another subterminal on the right. Each of those is a self-sufficient unit, serving its own concourse.

A difficulty with this plan—and you usually have one difficulty—was that our site was a bit too narrow to develop this scheme in the way that we should have. Our runways, which were parallel, are so close together that we had definite boundary limits.

This, then, is our expansion program: we add a unit to the left, we add a unit to the right, and then when we get up to 200 per cent of original size, we will have filled completely the capacity of this airfield. If it gets to that point—I hope it won't be before the year 2000—we'll have to build another airport somewhere else around the city.

DOMESTIC UNIT TERMINAL

UNITED AIR LINES TERMINAL BUILDING • NEW YORK INTERNATIONAL AIRPORT • SKIDMORE, OWINGS & MERRILL, ARCHITECTS • SEVERUD-ELSTAD-KRUEGER ASSOCIATES, STRUCTURAL ENGINEERS • SYSKA & HENNESSY, MECHANICAL ENGINEERS

When the design of the terminal was first undertaken, there were no jet aircraft in commercial service. The building, the baggage pods and loading bridges used by United Air Lines, and the airplane itself were designed concurrently. When the first United jet landed at Idlewild late in 1958, the terminal was opened to accommodate it.

The over-all layout was based on a hypothetical plane somewhat larger than the jets that actually use it. The basic building plan was selected because it permitted the greatest number of plane positions (14) on the 27-acre site. Clearance requirements for the aircraft limited the shape and location of the two loading fingers and left insufficient area on the entrance side of the building for two-level automobile access.

Outbound passengers enter the terminal under a deep canopy extending over 600 ft along the access road. United Air Lines passengers who are already ticketed deposit their baggage at one of three express check-in counters just inside the glass-walled lobby. Automatic equipment at these counters computes overweight charges and compiles the cumulative excess weight for each flight. From there, the baggage goes into a conveyor system that carries it to the baggage room in two-and-a-half minutes.

After checking in, the passenger proceeds by escalator to the upper level, where most of the public facilities and concessions are located. Waiting areas on this level are used mainly by visitors; except when flights are delayed, the outbound passenger can go directly to the hold room for his flight. The hold rooms in the United finger may be divided for the two classes of service by a movable screen. Passengers go through a boarding control desk at the entrance to the room; they then board the plane through two

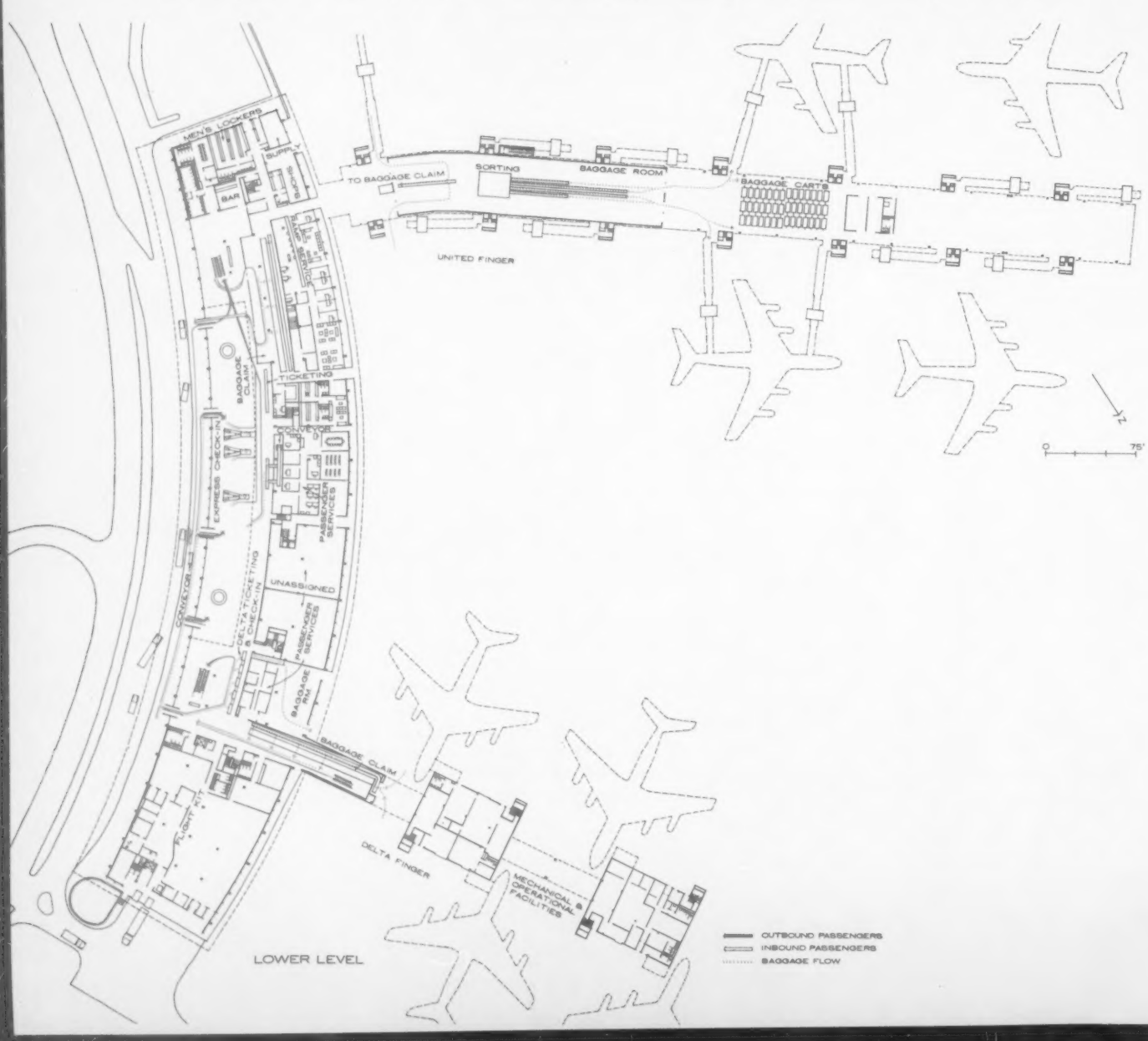
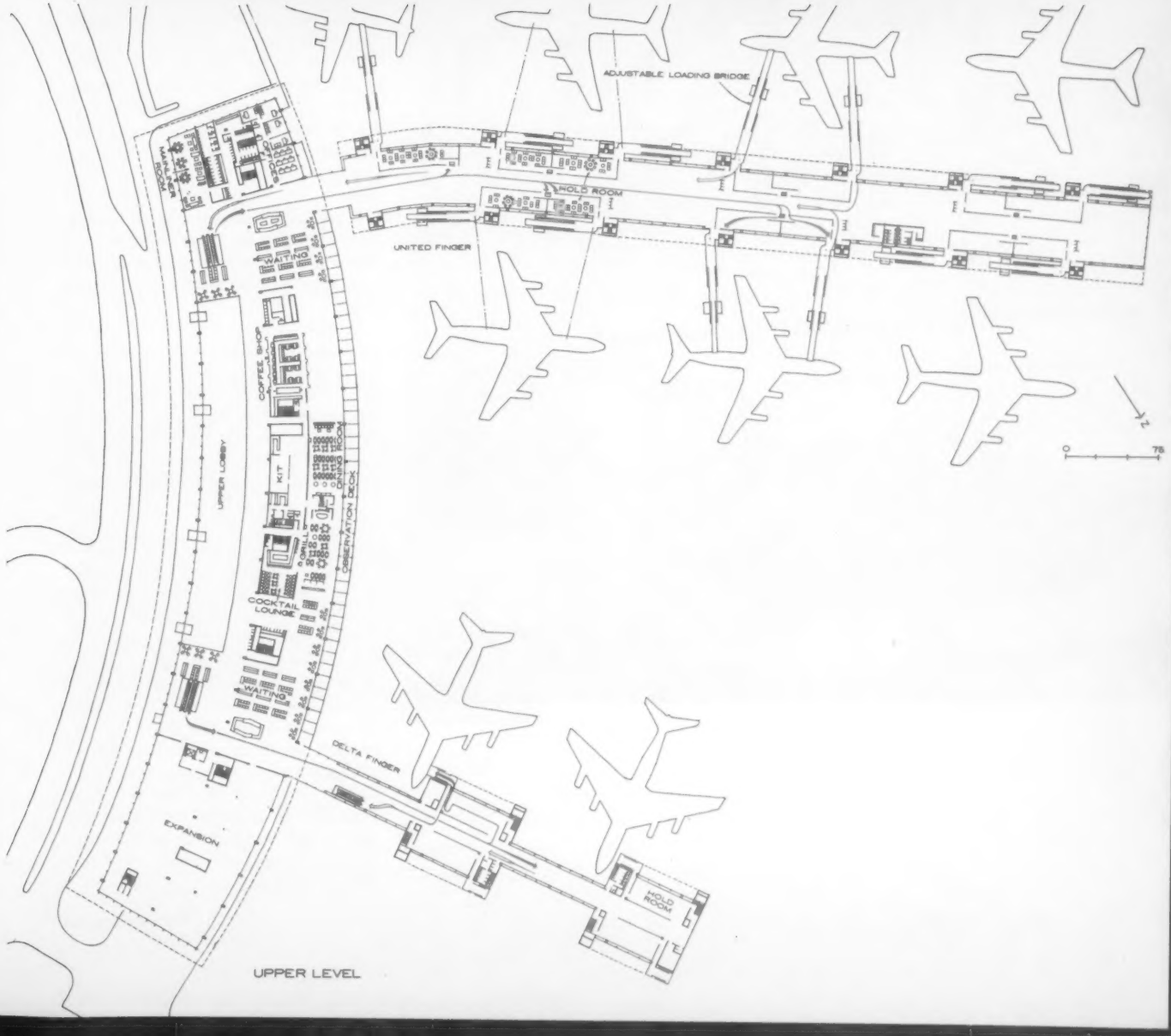


Photo: Ezra Stoller



UPPER LEVEL

Photo: Ezra Stoller

Courtesy Delta Air Lines

adjustable telescoping bridges without further checking. A corridor between the bridge and the main concourse of the finger eliminates interference between inbound and outbound traffic.

United planes move in and out of their parking position under their own power and park parallel to the loading finger, with bridges at both front and rear doors. Delta Air Lines, which occupies the other finger, uses a nose-in parking system, with only one short cantilevered loading bridge at each plane position.

The main body of the building was made thicker at the center, where most of the passenger facilities are located, than at the ends. The resulting variations in curvature made it necessary to use computers to lay out the steel structural frame. Since modular materials could not follow the complex geometry, terrazzo was used for floors and acoustic plaster for ceilings throughout this portion of the building. Recesses in the ceiling incorporate air-conditioning grilles and speakers for the public address system, leaving the panels between uninterrupted except by a regular pattern of lights.

Because of the greater likelihood of future alterations in the finger, less expensive materials were used there: asphalt tile for floors and acoustic tile for ceilings. A grid of recesses in the ceiling is designed to receive movable partitions. The steel frame of the United finger is designed with 50-ft clear spans throughout to allow for flexible arrangement of the upper level and provide uninterrupted space for the lower-level baggage room and circulation areas.

Because of the heavy concentration of jet exhaust, the concrete block walls and the steel window framing of the fingers are painted black. Wide roof overhangs shield the glass from direct sun and shelter the retracted loading bridges. The main portion of the building also has a wide overhang, with a 5-ft-deep aluminum fascia: the glass walls here are framed in aluminum.

The white and black color scheme of the exterior is maintained on the interior as well, with restrained accents of vivid blue and red. Incandescent lighting of low intensity (25–35 ft-c) has been used in the public areas, except over counters, where there are pools of fluorescent illumination. A uniform style of lettering, designed by Chermayeff & Geismar and based on the United Air Lines trademark, has been used on signs and items such as menus throughout the terminal. Teak, black leather, and deep red carpets were used in the dining areas to establish a restful setting from which to observe activity on the apron.

Courtesy The Port of New York Authority

Courtesy Union News Company

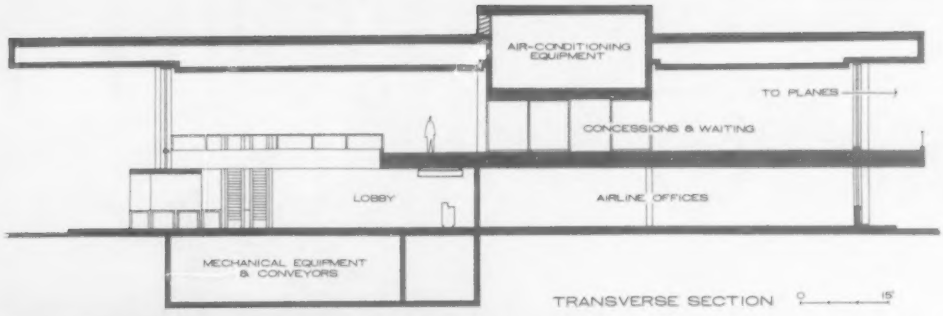


Photo: Stuart M. Smith

A conveyor carries inbound United baggage to the main lobby, where an automatic diverter distributes it on the self-claim counter (top photo). *The characteristic touch of SOM can be seen in the white surfaces and neat details of the coffee shop* (middle photo). *Movable translucent partitions separate the hold rooms from the concourse of the United loading finger* (bottom photo).

INTERNATIONAL UNIT TERMINAL

Photos: David Hirsch

PAN AMERICAN PASSENGER TERMINAL • NEW YORK INTERNATIONAL AIRPORT • TIPPETTS-ABBETT-MC CARTHY-STRATTON, ARCHITECTS-ENGINEERS • IVES, TURANO & GARDNER, ASSOCIATE ARCHITECTS

The design of the terminal is based on the ideal of the simplest possible passenger route to the plane. To meet this objective, outbound traffic is brought up to concourse level by a vehicular ramp, and planes are parked with their noses just a few feet from the glass walls of the concourse.

The passenger enters the terminal without the obstruction of conventional doors. Once inside, he has a clear view of all loading gates and most of the planes themselves; his need for directional signs is almost eliminated. When his flight is called, he boards his plane via an open ramp, protected from the weather by the roof canopy.

Baggage checked at the four express counters just inside the main entrance is carried by conveyor to the lower-level baggage room. Inbound baggage is placed on self-claim racks on the apron and these are carried to the claim area by fork-lift trucks and a special conveyor.

The separation of inbound and outbound vehicular traffic and the efficiency of passenger and baggage circulation were particularly vital in this terminal because of the high percentage of international traffic and its concentration in two brief periods daily. Relatively few passengers arrive by bus, already checked in, from an in-town terminal; about 75 per cent come by private car or taxi. During the peak periods, 2400 passengers may pass through the terminal in two hours. An unusually large number of guests, roughly one for every two passengers, must also be accommodated.

The waiting space in the main concourse level is furnished with islands of seating located near each of the gates. A coffee shop, a bar, and a restaurant are located

The elliptical roof canopy cantilevers 110 ft to shelter vehicular ramps and plane positions. Outbound passengers enter the concourse through an air curtain (below).

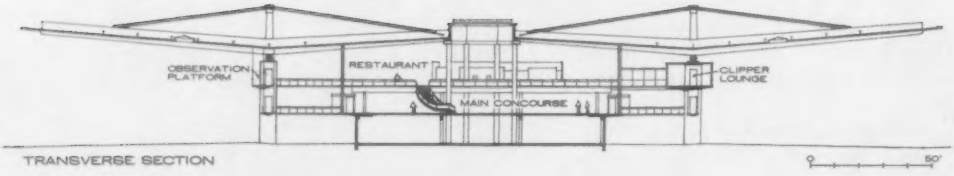
on a mezzanine overlooking the concourse; a special lounge, for passengers who have traveled more than 25,000 miles with Pan American, is suspended from the main piers above the apron.

Customs facilities for inbound international passengers will probably be added in the near future in the space now occupied by the inbound automobile ramp. The program of the terminal was based on the present airport system of processing all passengers requiring customs clearance at the International Arrivals Building, but congestion there has forced the Port of New York Authority, which operates the airport, to permit customs processing in the unit terminals.

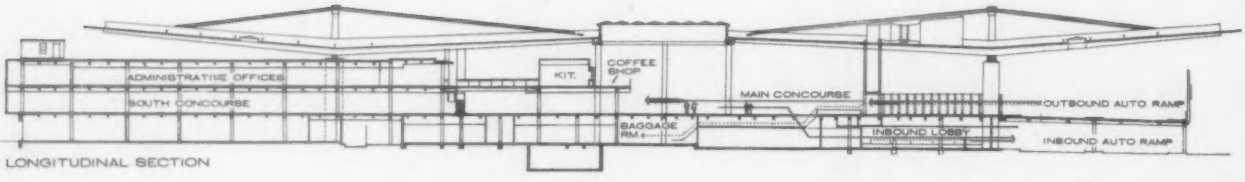
Provisions for both jet and propeller-driven aircraft were included in preliminary designs for the terminal (pp. 82–85, DECEMBER 1957 P/A); the establishment of jet service, exclusively, before the completion of the building permitted simplification in the distribution of utilities and the design of the boarding ramps. Ten jets can be accommodated on the limited wedge-shaped site, eight at the terminal and two at fueling stations along the airport taxiway. The protection of six of the plane positions under the roof canopy has proved a great operational asset in bad weather. Snow can be removed quickly, using only large equipment, since it does not pile up against the building itself.

The elliptical roof canopy is four acres in area. Its 110-ft overhang is supported by 32 radial girders of pretensioned steel resting on massive concrete piers at their approximate midpoints. The tensioning cables (six for each girder) are fastened to a central tension ring. To overcome the moment of the overhang, this ring is held down by six steel columns anchored in the hydraulic fill beneath the terminal with 1750 tons of concrete. The roof deck is constructed of lightweight reinforced concrete poured over 3-in.-thick cellular glass panels, which form the acoustically absorptive undersurface of the canopy.

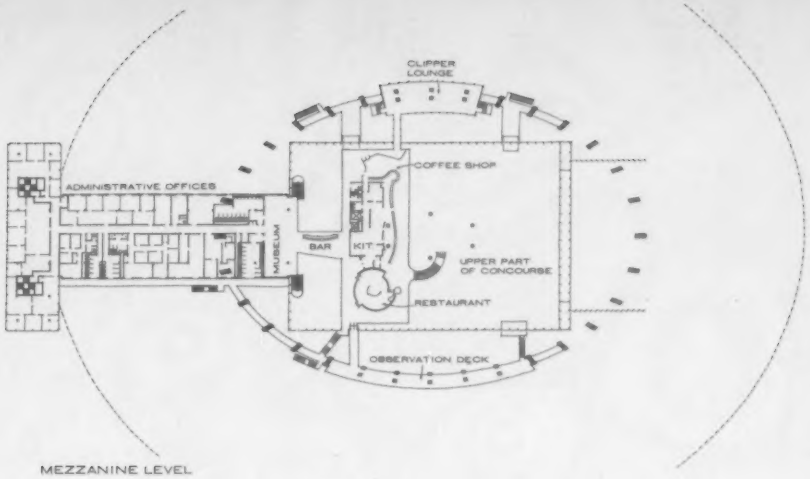
A large skylight at the center of the ellipse, and a ring of smaller ones in the overhang, admit needed light and dramatize the shade of the canopy. The principal night lighting is projected onto the underside of the canopy to produce low, indirect illumination. Light shining up through the



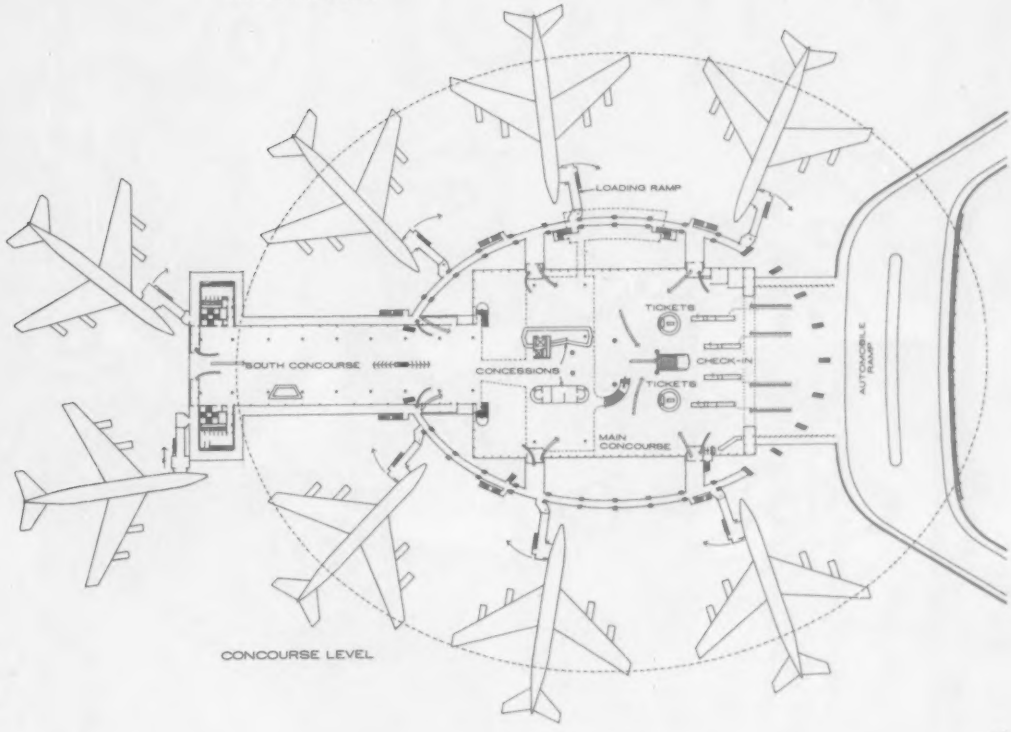
TRANSVERSE SECTION



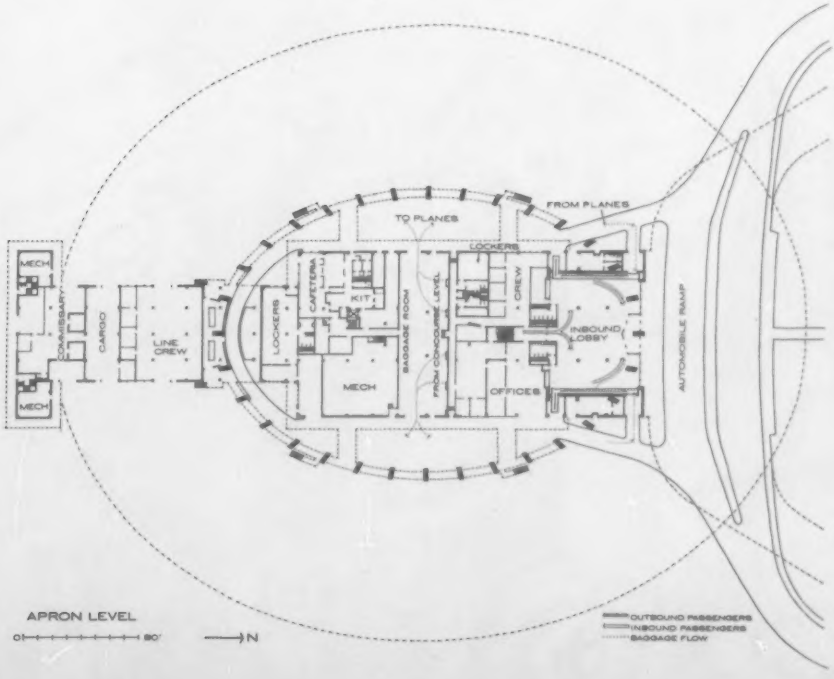
LONGITUDINAL SECTION



MEZZANINE LEVEL



CONCOURSE LEVEL



APRON LEVEL

0 20' N

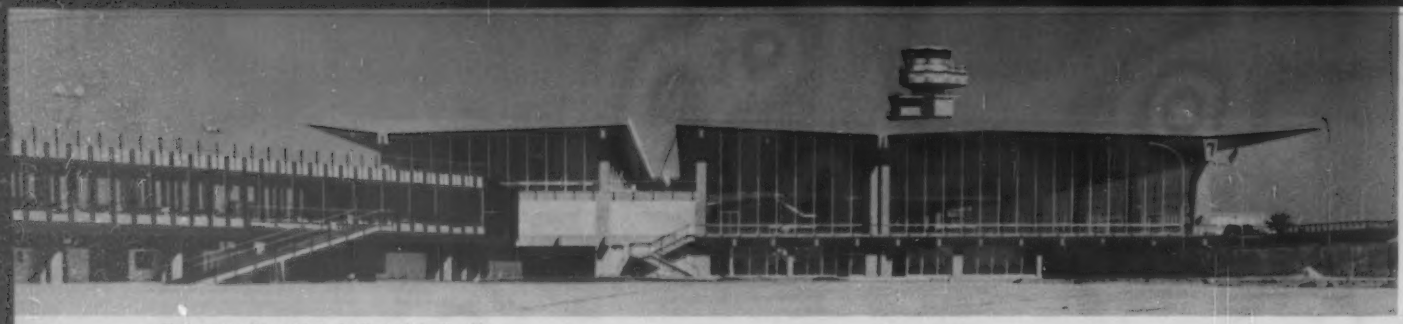
OUTBOUND PASSENGERS
INBOUND PASSENGERS
BAGGAGE FLOW

skylights makes a clearly distinguishable pattern when seen from the air.

The curtain walls of the main concourse are entirely of glass in steel frames. The ½-in. glass panels are exceptionally large; the largest measures 6 ft by 27 ft. An air-curtain opening 89 ft wide takes up almost the whole entrance side of the concourse. Fans located on the roof circulate about 600,000 cu ft of air per minute through the opening, by way of a glass plenum above it, and back up through glass ducts at either side. A system of glass wind-screens to the front and side of the entrance protects it from direct winds and permits the air curtain to function 90 to 95 per cent of the time. The opening can be closed under highly unfavorable wind conditions with a folding glass wall.

The terminal air-conditioning system is independent of the air-curtain, but adjusted to it. An effective pressure of about 3 in. is maintained inside the building and waste air is exhausted through the air-curtain system. The air intake is located above the canopy to eliminate contaminating fumes. All heating and refrigeration equipment uses hot and cold water circulated from the airport's central utilities plant.

The special "Clipper Lounge" (above) *is suspended over the plane positions. The apron is also visible from any part of the main concourse* (below). *To meet local building requirements, pipes between the canopy and the piers* (acrosspage) *were substituted for connections originally designed by the architects.*



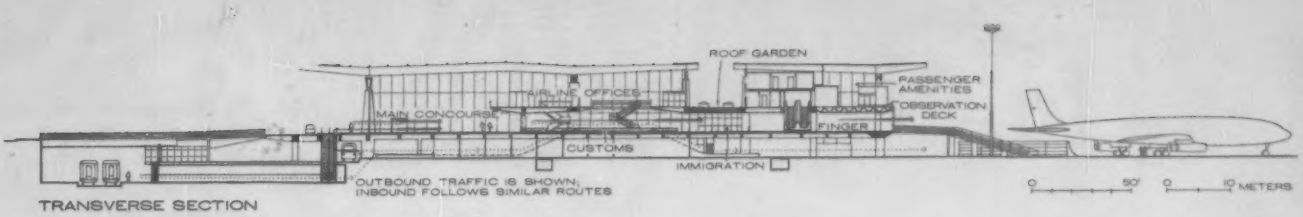
Photos, except as noted: G. Gherardi-A. Fiorelli

CENTRALIZED INTERNATIONAL TERMINAL

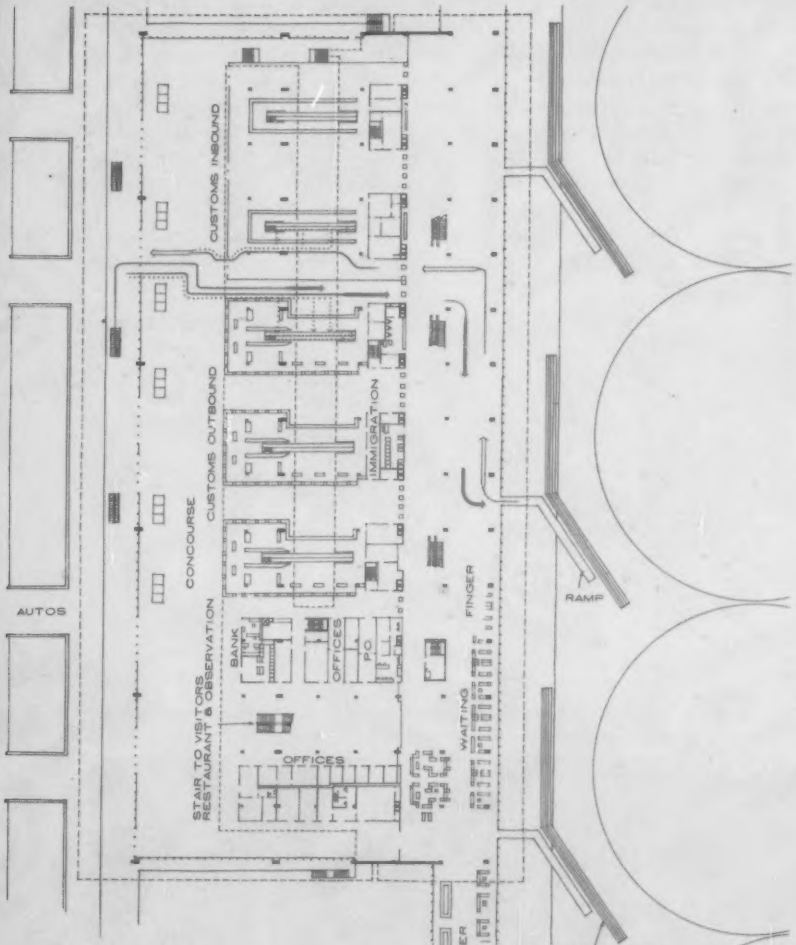
TERMINAL BUILDING • ROME INTERNATIONAL AIRPORT • FIUMICINO, ITALY • AMEDEO LUCCICHENTI, VINCENZO MONACO, RICCARDO MORANDI, AND ANDREA ZAVITTERI, ASSOCIATED ARCHITECTS AND ENGINEERS

Rome's new air hub has become a national topic of conversation in Italy. Although it does not incorporate the mechanical refinements of recent American air terminals, such as air conditioning to eliminate jet exhaust fumes, Fiumicino is a logical and impressive architectural solution to the problem of the centralized terminal.

All passenger services and administrative activities are concentrated in one vast hall; a two-level finger tangent to this



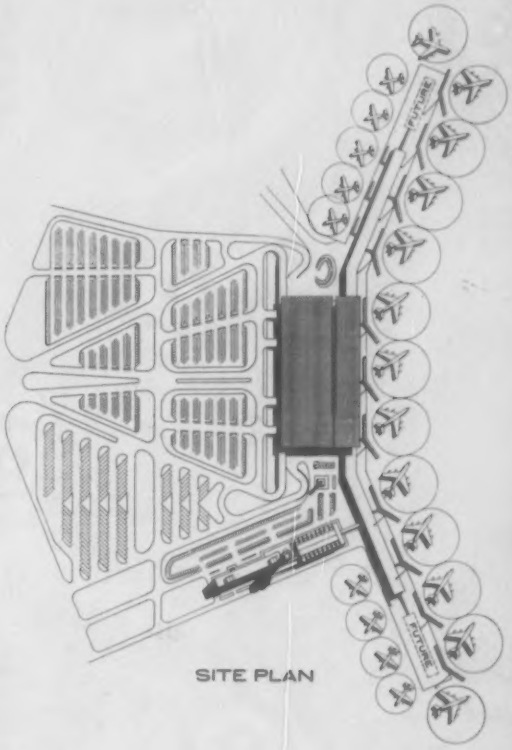
TRANSVERSE SECTION



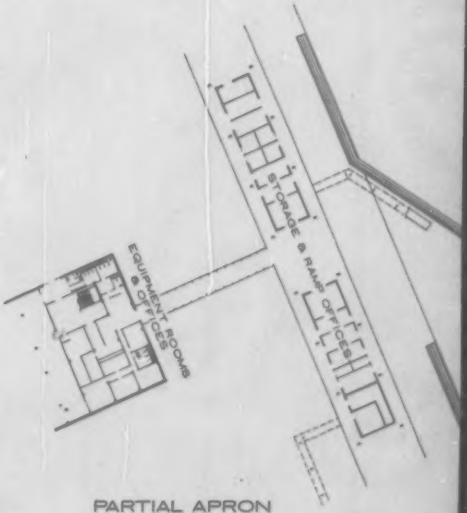
CONCOURSE LEVEL

0 100' 0 20 METERS

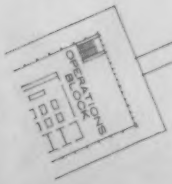
OUTBOUND PASSENGERS
INBOUND PASSENGERS
BAGGAGE FLOW



SITE PLAN



PARTIAL APRON LEVEL



main block extends 600 meters along the apron with positions for 13 jet aircraft and 9 propeller planes. The operations of the terminal are organized on three levels: at the field level are the baggage facilities, storerooms, and mechanical equipment; all passenger services are located on the main concourse level; and the offices of 22 airlines are on a balcony level overlooking the main hall.

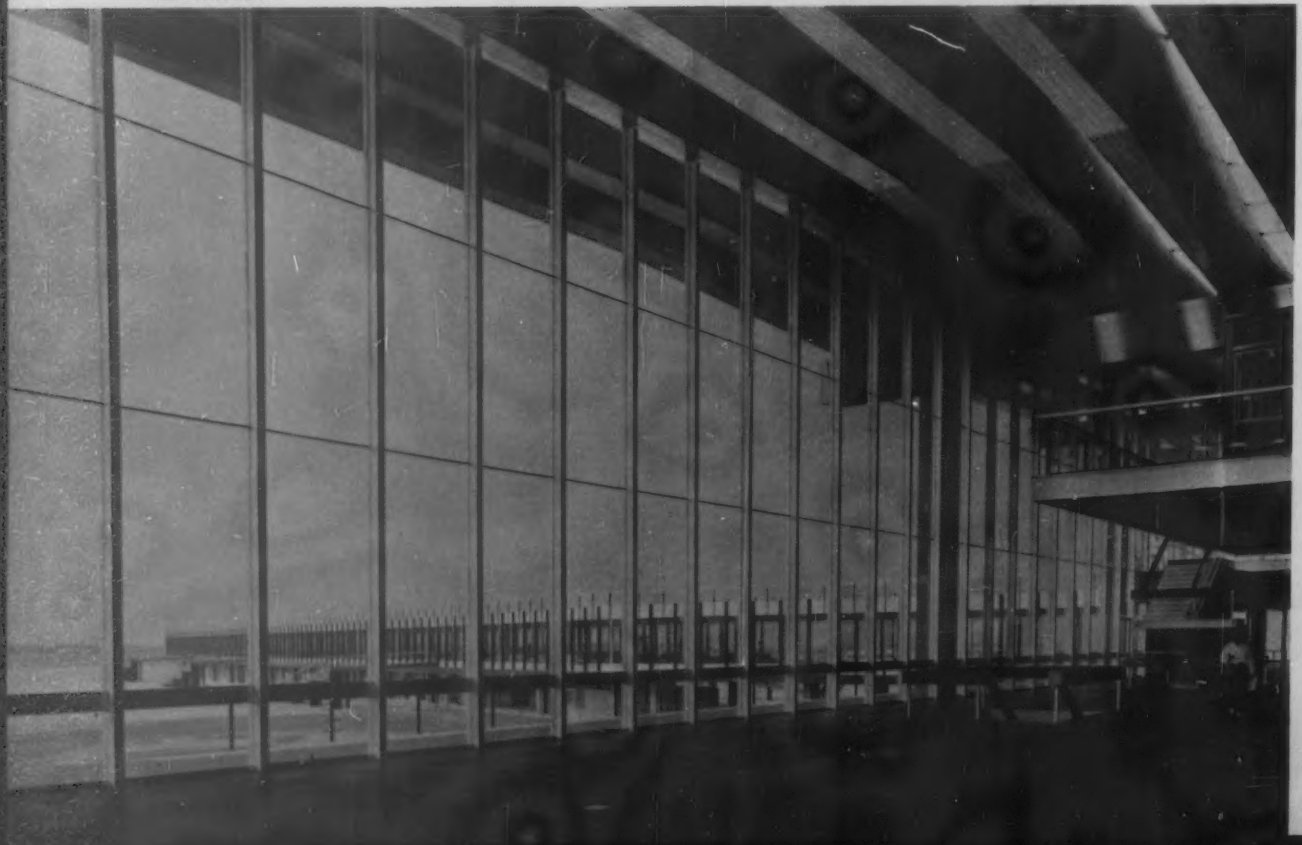
Buses and a projected rapid transit connection with Rome will stop at the field level, from which escalators lead to the main concourse. Automobile access is by a separate ramp up to the lobby level. A system of ten conveyors carries baggage up from the field level to the customs channels, four lanes for inbound passengers and six for outbound, and back down again to the claim area or to the baggage room.

After passing through customs inspection, passengers proceed into the finger, where they wait for flights to be called. Planes are reached by open ramps leading down to the apron at each parking position. Arriving passengers follow a reverse route, ascending the ramps and proceeding along the finger to the main passenger service hall.

The paths of inbound and outbound passengers mingle in the part of the finger that is adjacent to the main lobby. Above this, in a continuation of the main block, are amenities for in-transit passengers, such as a nursery, rooms where one can sleep for a few hours, and a balconied restaurant overlooking the field. The dif-

The view from the west end of the main concourse shows the loading finger and the aircraft parking positions on the entrance side of the terminal.

Photo: Oscar Savio



ference in function between this part of the terminal and the passenger service hall is indicated by a break in the roof, which permits an open garden on the balcony level.

The roof of the finger, which projects at the balcony level, serves as an observation deck. The structure of the finger is a steel frame painted black; the open-web steel roof girders are integrated into the concrete roof as additional reinforcement.

The main terminal building has a folded-plate roof system of separate cellular steel beams, with skylights filling in the strips between them. The undersurface of the trough-shaped beams is painted rust red. The roof is supported by a massive reinforced concrete structure, with clearly articulated joints.

The finger is a continuous waiting room for in-transit passengers.

Bridges over the customs lanes connect airlines offices on the balcony level.

Photo: Archie Handford Ltd.

DIVERSIONARY AIRPORT

TERMINAL BUILDING • LONDON (GATWICK) AIRPORT • GATWICK, SURREY, ENGLAND • YORKE, ROSENBERG & MARDALL, ARCHITECTS • FREDERICK S. SNOW & PARTNERS, CONSULTING ENGINEERS.

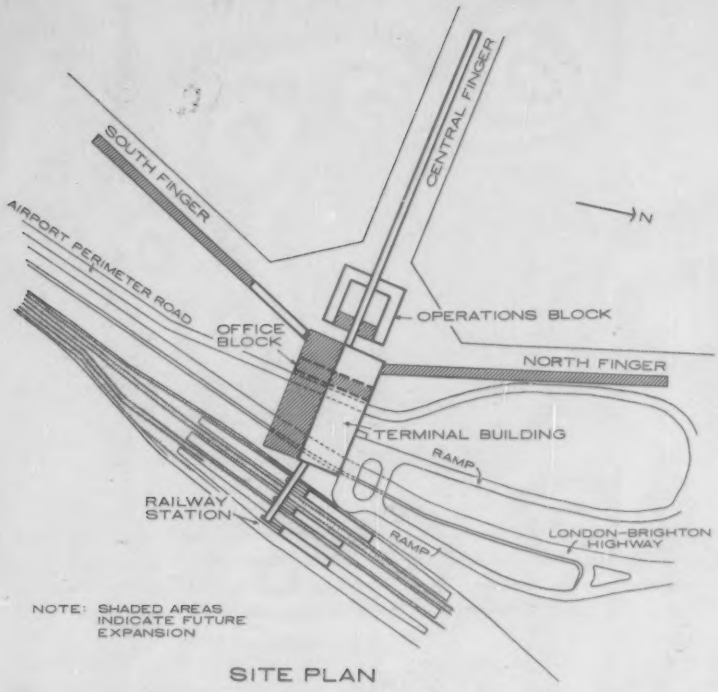
Gatwick Airport was built by the Ministry of Aviation to alleviate the air traffic load at London Airport and to serve as an alternate terminus for London in bad weather. It was planned to handle 480 passengers per hour in the beginning, principally charter services and flights to the Channel Islands. The site, 25 miles south of London, is relatively free of fog.

Running adjacent to one another past one corner of the site are both the main railroad and main highway connections between London and Brighton. The air terminal is located at this point, making it uniquely accessible from main lines of communication. A new railway station was built and linked to the air terminal by a footbridge that passes over the tracks and directly connects the station platforms with the main concourse of the air terminal. The height of the footbridge fixed the level of the main concourse at 23 ft above grade. Directly under the main concourse runs the highway; access to the building from the road is by means of ramps leading up to the concourse level on the north side.

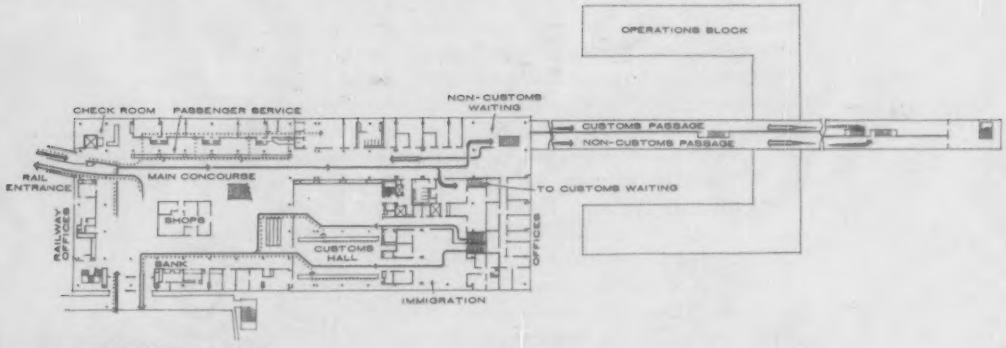
The terminal complex consists of three buildings: a rectangular block, which incorporates all passenger services, amenities, and administrative activities; a single-story operations block; and a finger, which accommodates 22 aircraft parking positions. Gatwick was the first airport in Europe to put a finger scheme into operation.

Planning for future expansion was part of the original program. The main terminal block can be increased on the south side to double its present size; provision has been made for vertical expansion in the form of a six-story office block above the roof; and two additional fingers, running at an angle from the north and south sides of the main building, can be added to accommodate seven more aircraft each.

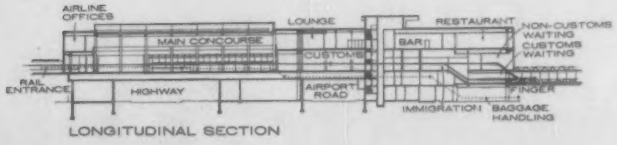
The separation of customs and non-customs passengers is a major factor in the planning of the Gatwick terminal. Passengers to the Channel Islands need not go through customs, and other outbound passengers undergo only nominal customs inspection. Baggage is collected at the weighing-in desks of the airlines and then proceeds on conveyors to the field-level baggage room. Passengers do not come under customs control until called to their flights and can, therefore, remain with visitors and use the shops and the lounge and restaurant, which are on a gallery overlooking the main concourse and the field. This is a change from the customary procedure at European terminals, where, as at Fiumicino,



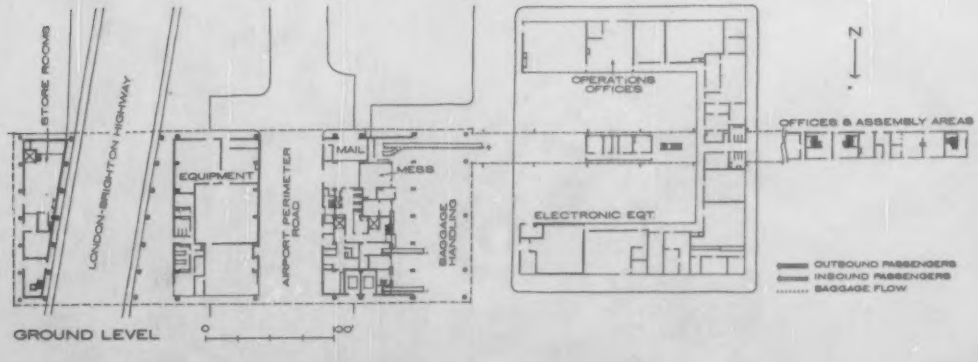
SITE PLAN



CONCOURSE LEVEL



LONGITUDINAL SECTION



GROUND LEVEL

for instance, outbound passengers proceed directly through customs and are thereby separated from visitors. That system requires a separate restaurant and amenities for visitors.

When flights are called, outbound passengers go through immigration into a waiting area or to a mezzanine level that separates customs from non-customs passengers. From either of these areas they proceed out into the finger, which is partitioned into two channels to maintain this separation. Stairs lead down to hold rooms at the ground level of the finger, from which point passengers walk to the planes on the parking positions.

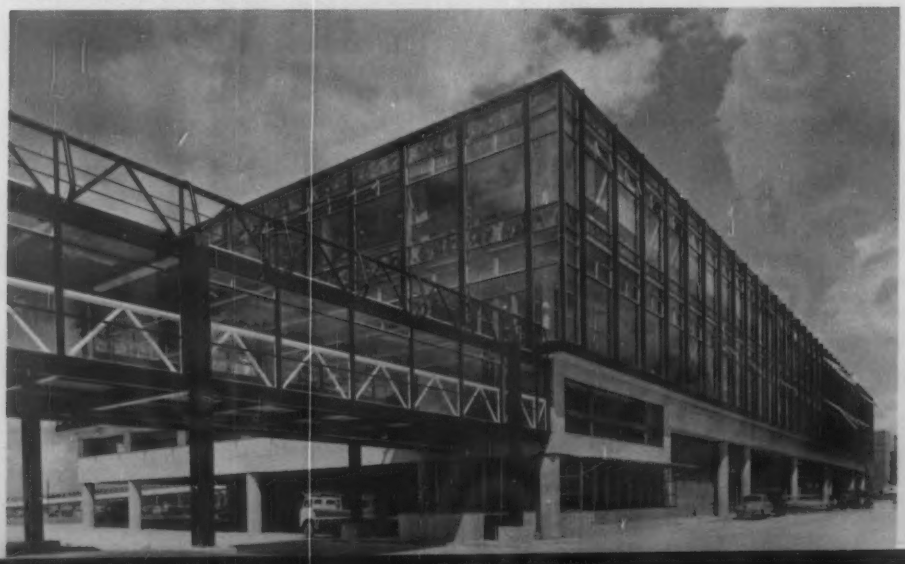
The structure of the main building is of reinforced concrete with circular columns and prestressed beams cast on the site; it is clad in a curtain wall of mahogany-framed glass panels braced between steel mullions painted black. Glass spandrels are screen-printed in a dark free-form pattern in order to avoid a strong horizontal emphasis. Recessed under the spandrels on the south side are awnings that pull out to shade the concourse windows (shown at far right in photograph below).

The interior of the main building contains many different elements, but the architects have achieved an over-all coherence by keeping large surfaces as clean and low-keyed as possible. The texture of the formwork has been left clearly exposed. In the main concourse (*acrosspage, top*) the center of the ceiling is made of anodized aluminum panels with louvered lighting strips which emphasize its length; the floor is green-black terrazzo.

The finger is a steel structure; welded tubular steel trusses serve as handrails on the passenger corridor level and on the roof.

The entire complex houses its services without ostentation and with considerable refinement.

Photos: John R. Pantlin, "The Architect's Journal"



The gallery-level restaurant (left) *overlooks the finger. Ceiling tracks on the left are for woven wood screens, which can be drawn to form intimate spaces. Tracks on the right permit light fixtures to slide to desired positions. The over-all color is gray.*

Aircraft traffic on the apron is supervised from a marshallers' control tower situated above the finger toward the runway end. Gate 8 is clearly identified for outbound passengers on the upper level and for passengers inbound from the field.

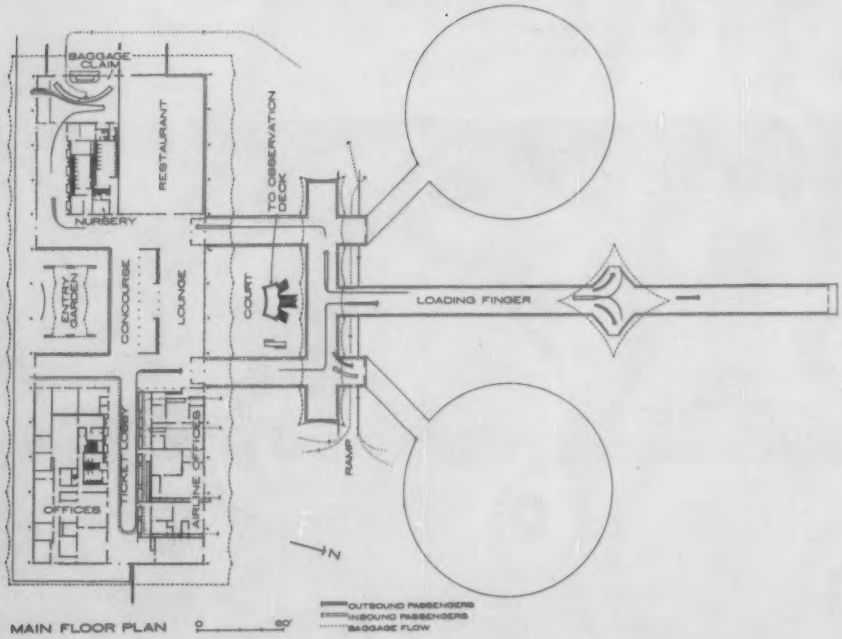
MUNICIPAL AIRPORT

TERMINAL BUILDING • ROBERT MUELLER MUNICIPAL AIRPORT • AUSTIN, TEXAS • OFFICE OF FEHR & GRANGER, ARCHITECTS • W. CLARK CRAIG, STRUCTURAL ENGINEER

The air traffic at Austin is not great enough to require the latest mechanical advances in passenger and baggage handling, but the planning of the new terminal is based on the same factors that govern the design of larger air terminals. The master plan is projected for two 10-year stages of expansion; the present terminal will be able to handle the maximum traffic volume of 162 passengers per hour predicted for 1970.

The terminal is a one-story rectangular building with a field-level finger extending out onto the apron; three aircraft parking positions are accommodated on each side of the finger. The control tower rises above the terminal building and is a distinctive landmark both from the ground and from the air. All passenger, baggage, and administrative operations are contained in the terminal building, as well as several facilities, such as mail, express, and cargo, that

Photos: Dewey G. Mears



MAIN FLOOR PLAN

The airlines check-in counters (top) *are to the east of the terminal's main concourse* (middle). *Covered passageways for inbound and outbound passengers connect the concourse with the loading finger. A broad canopy over the middle of the finger* (below) *shelters two boarding gates. This canopy will be repeated when the finger is extended.*

The undulating curves of the terminal complex were adopted to "express the spirit of progress in air travel today."

are often housed in separate buildings.

Inbound and outbound passengers and baggage are separated by means of a one-way counterclockwise route. Outbound passengers check in on the east side of the building and proceed to the finger by way of a passage on the east side of the concourse. Inbound passengers enter the terminal by a passageway on the west side of the concourse.

Baggage collected at the airlines counters is carried by short conveyors to the apron side of the building, where it is loaded onto trucks that take it to waiting aircraft. A ramp, which tunnels under the building end of the finger, permits the trucks to pass from the east side of the apron to the west side without having to go around the finger. Inbound baggage is deposited at the claim counter at the west end of the terminal.

The terminal building has a steel structure with a roof system of 5-ft-deep steel trusses running between the long sides. Diamond-shaped trusses with concave chords are cantilevered on both sides of the main trusses. The curved fascia is of porcelain-enameled steel; lightweight concrete is used for the roof and ceiling surfacing. A minimum of bearing members is used on the interior to facilitate alterations.

The finger is an open walkway sheltered by a steel-framed canopy. The control tower has a concrete frame and an aluminum and glass exterior.

The design of the terminal won a P/A Design Award in 1959, at which time the jury distinguished it as a runner-up for the First Design Award. As a finished project, the terminal closely adheres to the original design.

AIRPORT DEVELOPMENT PLANNING

A master plan for the future development of the Dulles International Airport, which is now under construction near Chantilly, Virginia, has been prepared by the architects and engineers for the airport, Eero Saarinen & Associates, Ammann & Whitney, Burns & McDonald, and Ellery Husted, with planning consultant Burnham Kelly. The plan recognizes the need for visual discipline in a complex that is to be a major gateway to the national capital. A set of regulations has also been drafted and submitted for the approval of Federal authorities. It would establish a unique organization to administer the plan and to co-ordinate with local governments in controlling the development of the surrounding region.

The passenger terminal, however significant, is a relatively small part of a major airport. A vastly greater area is occupied by hangars, service facilities, warehouses, cargo and mail terminals, utilities, communication services, Government agencies, hotels, and light industries. The jumble of structures, large and small, permanent and temporary, that have accumulated at our present metropolitan airports clearly indicates the need for close control over construction within airport precincts.

The physical impact of the airport on the landscape and the community extends far beyond its boundaries. Just outside the airport property itself, light industry, offices, and housing developments tend to flourish. The attraction of convenient air transportation, good highway connections, and an expanding market for labor and services may more than outweigh the disadvantages of aircraft noise.

The new Dulles International Airport, situated on a 9600-acre site 27 miles west of Washington, is bound to have a powerful effect on the surrounding area. Remote as it is from any urban complex, it will generate immediate growth of housing and commercial facilities, with no unified or experienced local government structure to establish planning goals or impose controls. Plans have already been announced for an "International Center" at nearby Chantilly, now a village of less than 1000 people. It will include a convention hall, a motel, a shopping center, bowling alleys, a miniature golf course, and parking lots for 6000 cars. Another group of entrepreneurs is planning a "multimillion-dollar" industrial park to occupy 2600 acres in hitherto rural Loudon County.

In recommending the adoption of the development regulations, the airport architects and engineers explain the necessity of a special organization to control future development:

"This gigantic Government facility will

AREA CLASSIFICATIONS

A Aircraft Circulation Area
Defined by FAA standards for the operation of aircraft; includes approach zones, runways, taxiways, aprons, clearance areas, navigational aids, and other similar functions.

B Greenbelt and Vehicular Circulation
Primarily reserved for woodlands, roadways, and special uses, such as navigational aids, utilities, incinerators, stabilization ponds, service stations, and motel.

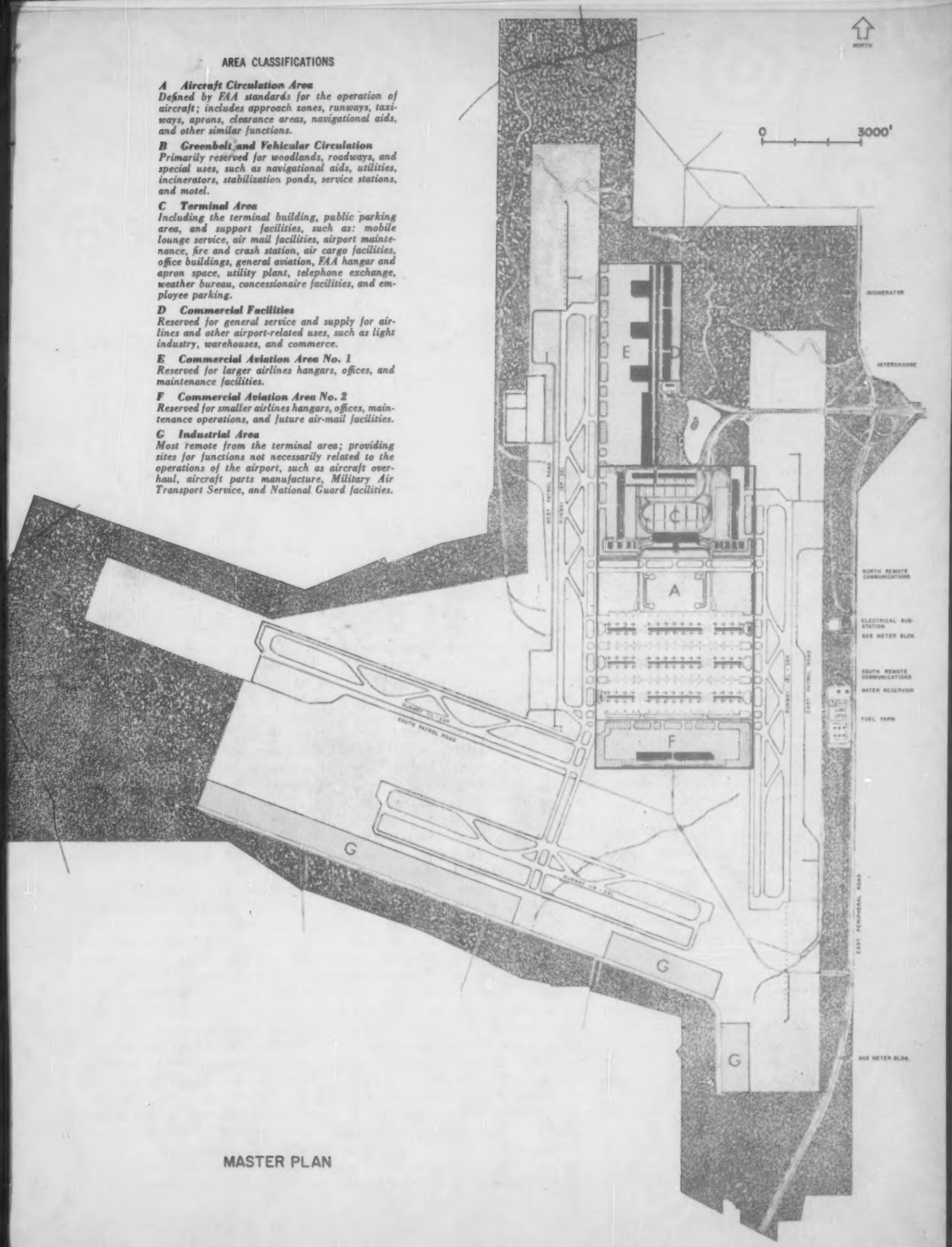
C Terminal Area
Including the terminal building, public parking area, and support facilities, such as: mobile lounge service, air mail facilities, airport maintenance, fire and crash station, air cargo facilities, office buildings, general aviation, FAA hangar and apron space, utility plant, telephone exchange, weather bureau, concessionaire facilities, and employee parking.

D Commercial Facilities
Reserved for general service and supply for airlines and other airport-related uses, such as light industry, warehouses, and commerce.

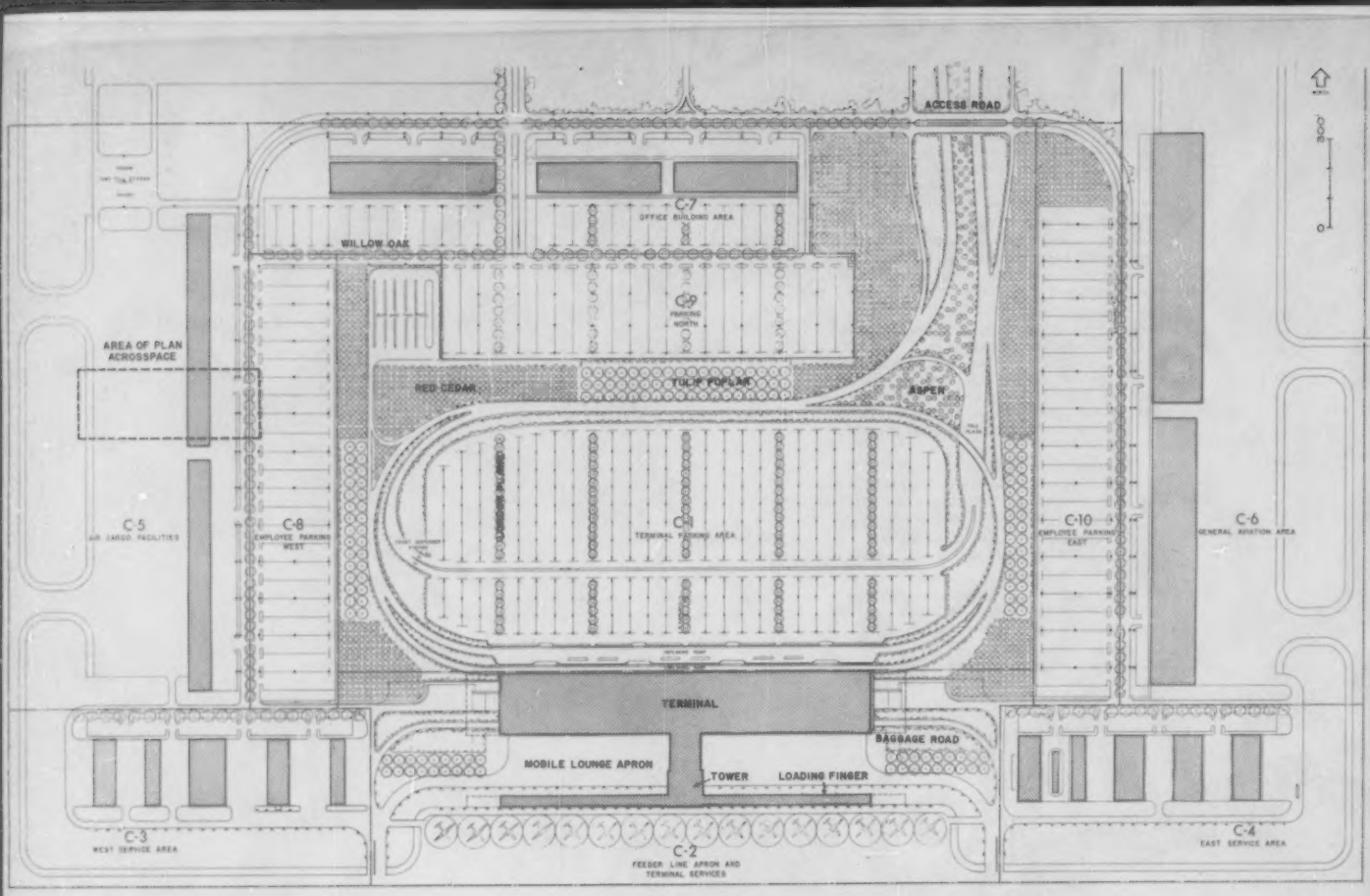
E Commercial Aviation Area No. 1
Reserved for larger airlines hangars, offices, and maintenance facilities.

F Commercial Aviation Area No. 2
Reserved for smaller airlines hangars, offices, maintenance operations, and future air-mail facilities.

G Industrial Area
Most remote from the terminal area; providing sites for functions not necessarily related to the operations of the airport, such as aircraft overhaul, aircraft parts manufacture, Military Air Transport Service, and National Guard facilities.



MASTER PLAN



stimulate growth of the largest new urban complex in the booming national capital region, and the Government cannot discharge its responsibilities solely by providing a 1000-ft wide buffer strip between the airport and its neighbors. Needed is a function that will, like the Air Installations Office at an Air Force base, cope with external problems of urban planning and public relations.

"The development of the airport will take place over a period of years, during which there will be significant developments in building materials and techniques and in airport operations. Very likely, changes will be made also in some of the assumptions upon which present plans for the airport have been based. An excellent set of plans and specifications, backed by fixed standards, can go far in the direction of assuring the development of an outstanding airport, but it is not only impossible, but highly unwise, to attempt to pin down every detail of the entire future development from the start without providing a mechanism for necessary adjustment and change.

"A new mechanism is needed to deal with these problems."

They then recommend the appointment of an Airport Development Officer and a Development Advisory Board. The establishment of these positions would permit the Airport Manager to devote his full attention to operational matters.

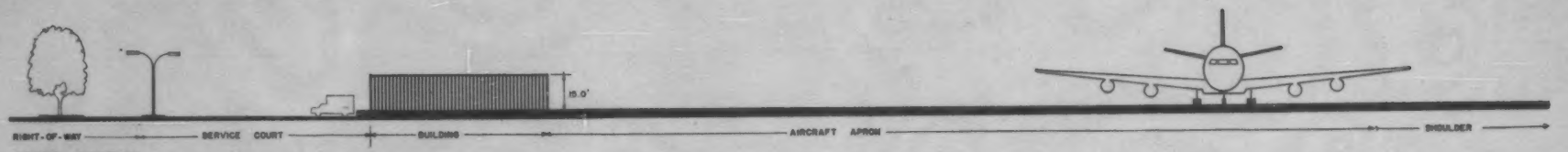
The Development Officer would be someone "whose background in training and experience shall be in major development design." His functions would be to assure compliance with the regulations, exercising "a limited degree of discretion" in their interpretation; to refer to the Advisory Board any proposal substantially deviating from them; and to maintain records of building development and maintenance and other matters, such as concessionaire operations, employment, traffic, and parking, which may be considered important for planning purposes. He would maintain close relationships with public officials and planning agencies representing the surrounding communities, "supplying such information on actual and projected development as will help to promote healthy and friendly relations with the airport, and encouraging the creation in these communities of planning and development measures that will best serve the mutual needs of the communities and of the Dulles International Airport."

The Development Advisory Board is to be comparable to the boards guiding the development of Los Alamos or the foreign building operations of the State Department. The board would be composed of "three outstanding professionals in the building development field, with particular emphasis placed upon high skills and attainments in architectural design." The board would meet on the call of the Airport Development Officer to approve building plans or authorize modifications of requirements. It would also meet annually to review the physical development of the airport and the state of airport-community relations, reporting its conclusions and recommendations to the FAA Administrator.

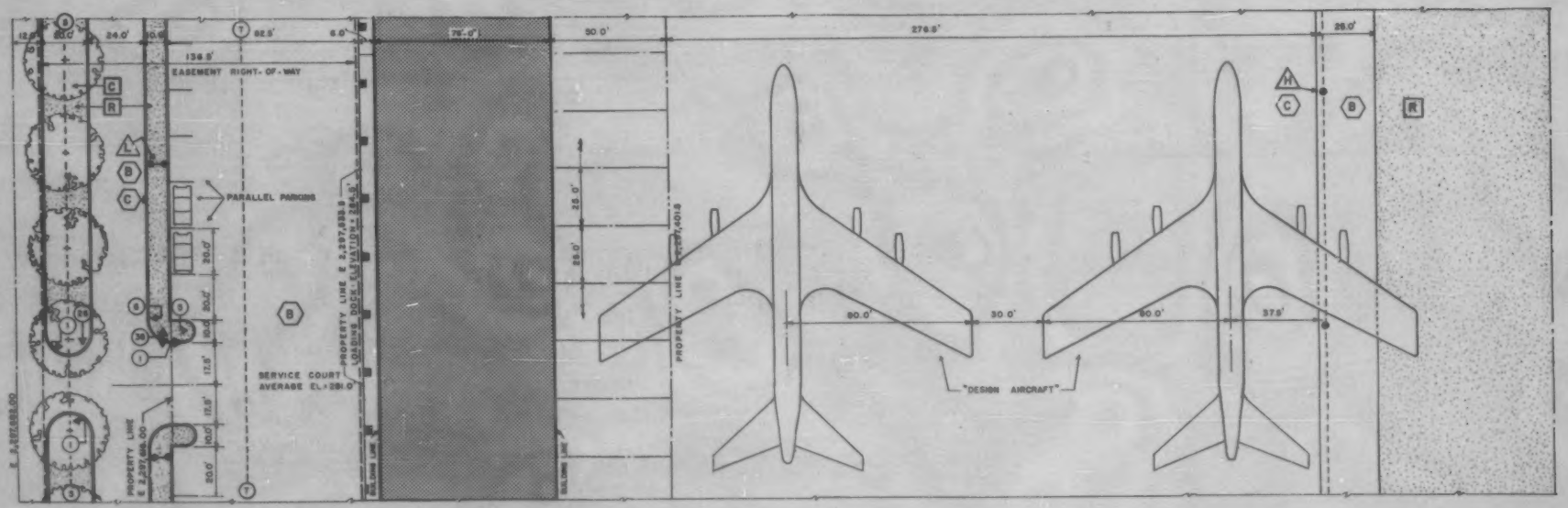
The Master Development Plan, which will be the basis of all of the regulations, includes a master development map, showing physical features such as roads and buildings, and specifying setbacks, height and form restrictions; standards for airport roadways; a master landscape plan; building materials and color schedules; and a sign schedule.

The area acquired for the airport is of such size that any need for additional land in the future would be highly unlikely. The boundaries of the site have been fixed at a minimum of 2000 ft, laterally, from any of the four runways, and 8000 ft at the ends.

In the 1000-ft-wide buffer strip, existing trees will be left undisturbed and new ones

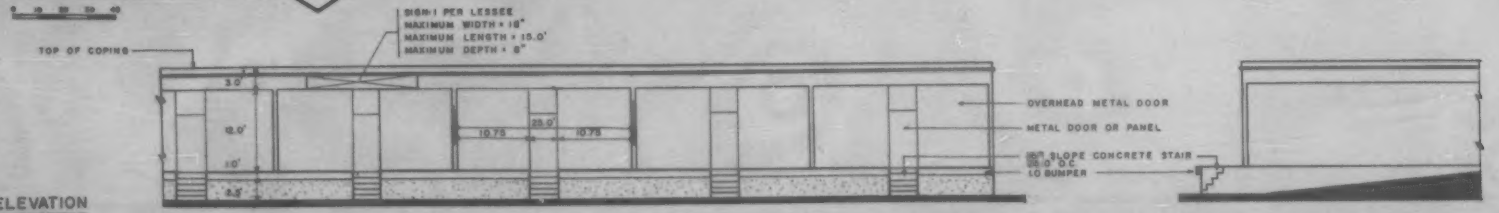


CROSS SECTION



PARTIAL SITE PLAN

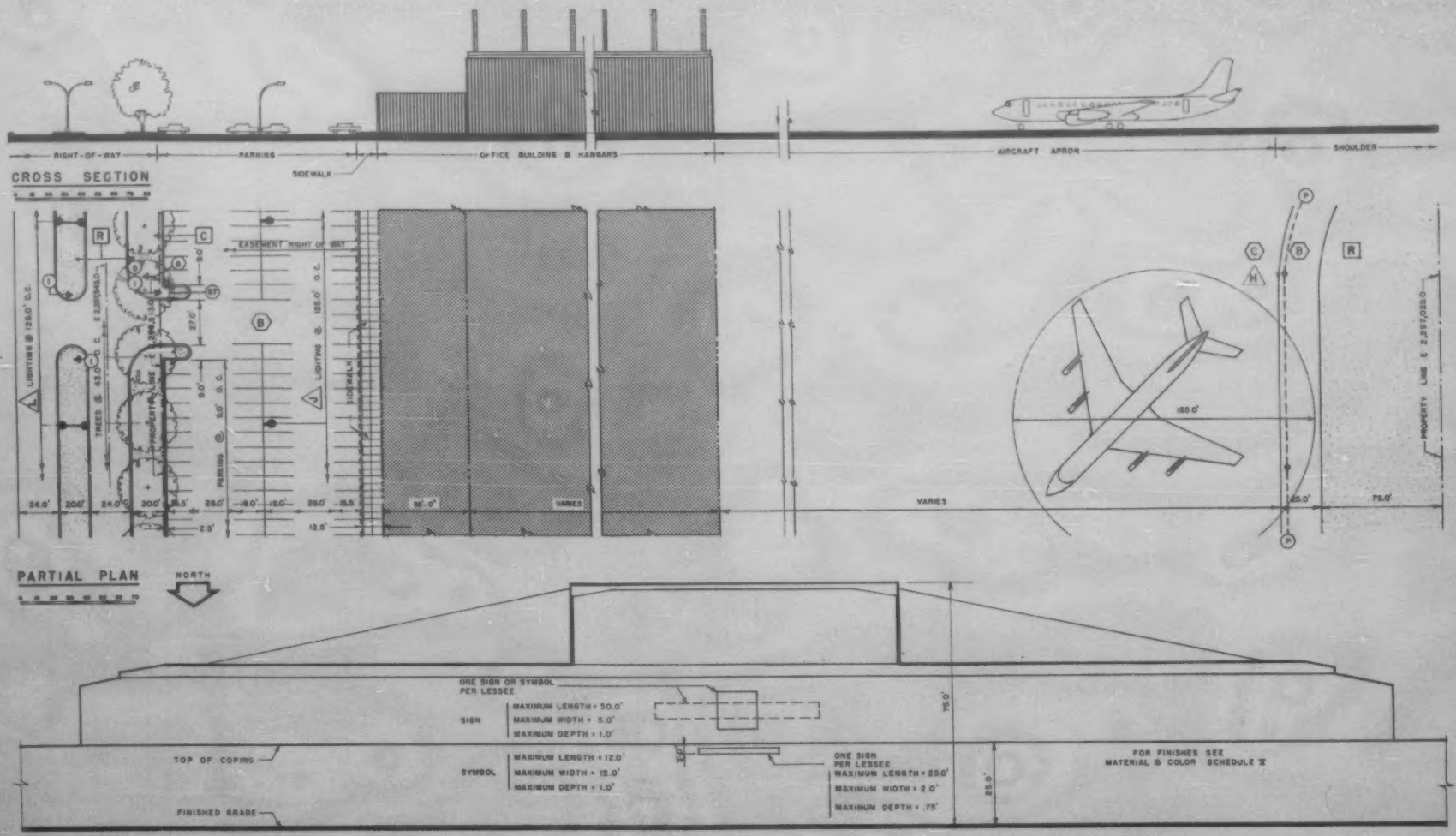
NORTH



ELEVATION

C-5: AIR CARGO FACILITIES

DETAILS



E: COMMERCIAL AVIATION AREA

DETAILS

will be planted to fill any gaps. It is expected that this woodland will substantially reduce the amount of ground noise reaching the surrounding areas and that it will have a pleasant appearance from either side.

The degree of control over building design, and such items as signs and lighting, varies depending on the prominence of the location and the distance from the passenger terminal. Buildings fronting on the main parking area north of the terminal will be specified as to height, material, and form. In most cases, the building line on the side facing the terminal is fixed, and a line is established on the other side beyond which the structure must not project.

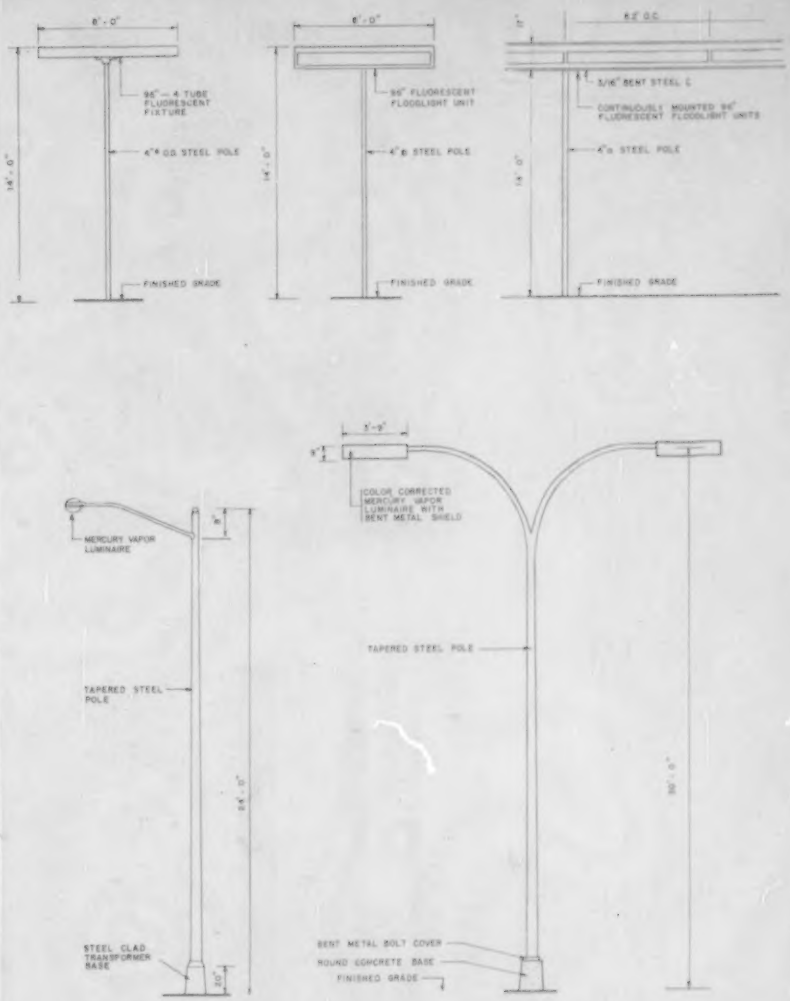
For the air cargo area (C-5), the elevations of the buildings are outlined. The office buildings to the north (area C-7) are less rigidly defined, but all must be 25 ft in height and be faced in metal curtain wall of a prescribed shade of gray. In the general aviation area on the third side of this quadrangle, a maximum height of 65 ft and an eave line at 39.3 ft have been set. A uniform marquee 2 ft high and 14 ft above grade is specified, below which all openings on the west side of buildings must be contained.

Where the expressway from Washington enters the airport, landscaping, buildings, and signs will be carefully controlled. Definite ground plans have been established for the two service stations in this area and the motel will be located within a specified area beside the lake. The only signs identifying these facilities will be those placed along the roadway by the airport administration.

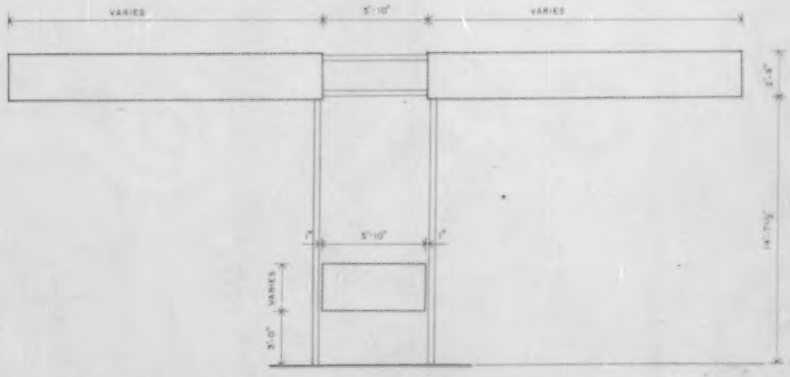
"Large display signs featuring the commercial trademark of products or services" are prohibited in all areas of the airport discussed above. All building materials are specified in black, white, or shades of gray.

In the service areas, definite limits on the extent and height of buildings have been established. Throughout these areas and the more central areas, signs are generally limited to one per building. They must be of a specified size and position: either flat against the building or free-standing near the ground. No floodlighting is permitted on or from a building "other than lighting reasonably required in connection with access and loading." All utilities must be underground; no fences are allowed.

In the industrial area along the southern boundary of the site, restrictions will presumably be less strict. In their present form, the regulations require only that building designs meet the approval of the Airport Development Officer.



Lighting standards for the entire airport complex are located and specified in the Master Development Plan. The types illustrated above are intended for use along roadways and in parking and service areas.



This type of sign, one of several designed for the airport, would be set between two adjacent roadways.

Interior

AIR FRANCE TICKET OFFICE, NEW YORK, NEW YORK • MARVIN B. AFFRIME OF THE SPACE DESIGN GROUP AND ROBERT PONTABRY, DESIGNERS • MARTIN LOVETT, STRUCTURAL ENGINEER • MARTIN GARON, LIGHTING CONSULTANT

For their remodeled Fifth Avenue headquarters, Air France wanted a ticket office that would reflect the size and the progressive thinking of the airline and that would have a French flavor. To achieve this they secured the collaboration of Marvin Affrime, who has designed a variety of offices for the company in this country, and of Robert Pontabry, Parisian indus-

Photos, except as noted: Bernard Liebman

Used as Airline's Poster

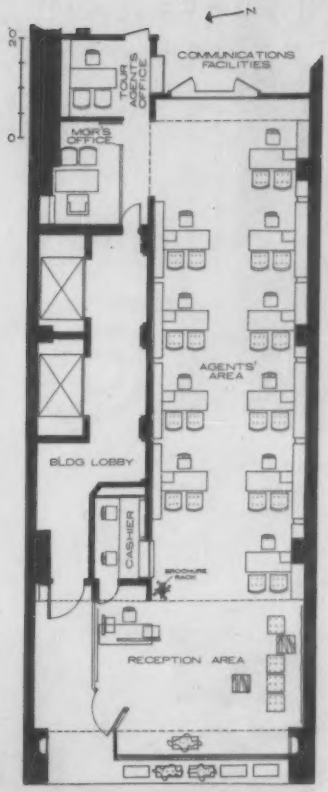
trial designer, who has previously worked for them in France.

Confronted with a narrow building, the designers removed a 1920's store front and created a spacious opening two stories high. The second floor was set back, giving it the appearance of a mezzanine, which, though enclosed with striped glass, seems to be a part of the space below. A 30-ft-high glass wall recessed 3 ft from the building line was framed by alternate stripes of white and black—marble, granite, and a lighting strip—that emphasize the two-story opening. Marble planters, which are both inside and outside the glass façade, call attention to the step at the curb beam and prevent short-sighted attempts to wander through the glass wall.

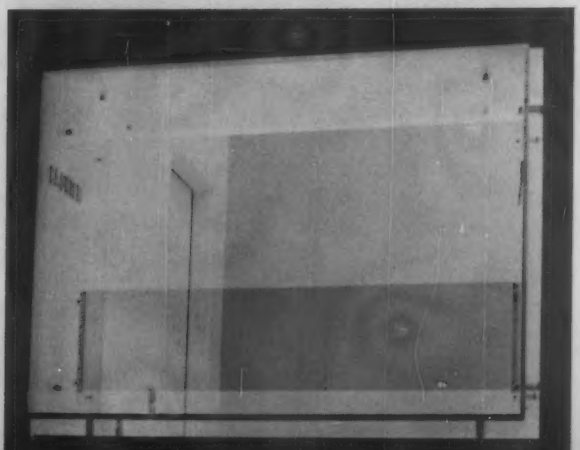
From the street, the interior of the ticket office appears as one large space; however, it is subdivided into two areas by contrasts of textures and lighting and by a change in ceiling height. The reception area at the front has a lowered ceiling and is slick and bright; the agents' area in the rear is soft, warm, and subdued under a higher ceiling. Vertical lighting strips in the right wall define each agent's office space and minimize the length of the room.

The colors have been manipulated to integrate the two areas. The visual play

Photo: Courtesy Air France



The Gemmail glass panel on the rear wall (across-page) *is centered to relate to the over-all façade. The left wall bears an air map, which every airline seems to consider indispensable. This one* (below) *is subdued: ebonized mahogany panels are cut out to reveal cork continents; white plastic tube air routes are highlighted in red at landing points. The cashier's window* (bottom) *has a gray and satin glass frame suspended from chrome pins.*



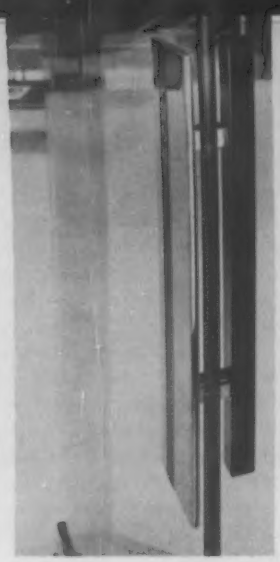
of alternating black and white in the façade gains intensity in a bold black, white, and gray tapestry on the right wall just inside the glass and is carried to the rear by an ebonized mahogany and white-lined map on the left wall. In the agents' area, the black and white scheme is softened to a calm gray. Mottled gray vinyl on the rear wall restates the texture that footprints give the gray carpet and unifies the area. This calm is punctuated by a brilliant red in a stained-glass panel. Upholstery brings the red forward, spreading it in area and softening it to magenta and purple; red flowers in the planters echo it at the façade. The interplay achieves a rich consistency.

Within the background of different wall treatments, specially designed furniture and appointments (*see next page*) are cleanly and lightly detailed. Materials from many parts of the world symbolize the international scope of the airline. The specially commissioned tapestry and Gemmail glass panel, which are used to associate travel with luxury and with the grand tour of art treasures, represent modern directions in two techniques long associated with France.

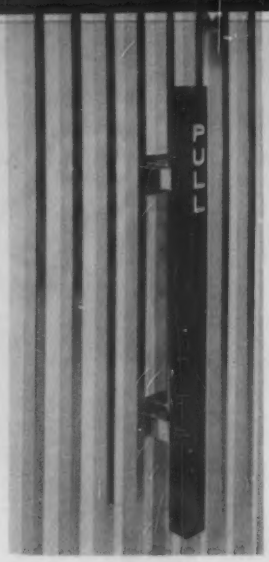
Window posters in the ticket office have been eliminated; the spirit and operation of Air France are elegantly displayed by the suave interior itself.

DATA: descriptions and sources of the major materials and furnishings shown.

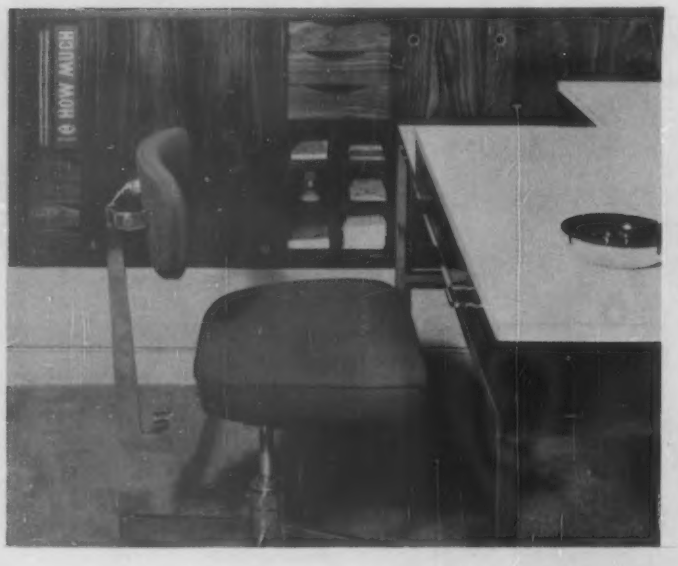
FLOORING: terrazzo/off-white/V. Foscato, Inc.; carpet/wool/gray/Rugcrofters through Carpet Salesmen, Inc. **WALLS: Façade:** Swedish pearl granite; Vermont white marble/Friedman Marble & Slate Works; ⅛" plate glass/Pittsburgh Plate Glass Co. **Entry:** smelte mosaic tile/aquamarine/variegated/Italian/V. Foscato, Inc.; corrugated steel/polished face/satin returns/white enameled recesses/Haber & Henry. **Mezzanine:** Belgian marble/black/Friedman Marble & Slate Works; glass/sandblasted stripes/SDG-design/Haber & Henry; framing/aluminum/Hinzmann & Waldmann. **Rear:** vinyl/gray/mottled/Leatherguild, Inc. **Right:** vinyl/white/Charlan Industries. **DOOR:** glass/Herculite/Pittsburgh Plate Glass Co. **CEILING: Reception area:** lowered/plaster/painted/pale gray. **Agents' area:** sprayed acoustical plaster/white/National Gypsum Co. **LIGHTING: Façade strip:** cold cathode strips/National Cathode Corp./recessed behind white plastic/Pontabry-design/custom-made. **Downlights:** Alzack hi-hats/Gotham Lighting Corp. **Vertical strips:** 6" wide/fluorescent/behind opal plexiglas. **FURNITURE, FABRICS: Reception desk:** white Vermont marble; Brazilian rosewood; gray glass/Pittsburgh Plate Glass Co.; steel/SDG-design/custom-made. **Receptionist's chair:** chrome steel/swivel base/Do-More Chair Co.; purple wool/Herman Miller Inc. **Reception benches:** chrome steel/natural leather/welted/SDG-design/Edgewood Furniture Co. **Reception tables:** chrome steel/polished black marble/SDG-design/Edgewood Furniture Co. **Agents' storage cabinets:** left, wall hung/right, recessed/Brazilian rosewood throughout/SDG-design/Hinzmann & Waldmann. **Agents' desks:** chrome steel/rosewood/white Formica/SDG-design/Hinzmann & Waldmann. **Agents' chairs:** chrome steel/swivel base/Do-More Chair Co.; magenta wool/Herman Miller Inc. **Customer chairs:** "Polaris" chair/flattened oval steel tubing/Stendig Inc.; left side: light gray wool/box tufted/Anton Maix Inc.; right side: deep purple wool/box tufted/Herman Miller Inc. **STAINED GLASS PANEL:** "City Lights"/blue, red, yellow, green/Danielle Dhumez-design/Gemmail glass technique by Roger Malherbe-Navarre; lighted from behind/fluorescent strips/Neo-Ray Products Inc. **TAPESTRY:** "Galaxy"/black, gray, white/Henri-Georges Adam-design/Aubusson. **MAP WALL:** ebonized mahogany cutouts over cork/white plastic/Pontabry-design/custom-made. **ACCESSORIES:** ashtrays/polished chrome/rich blue enamel inside/Loumac Supply Corp.

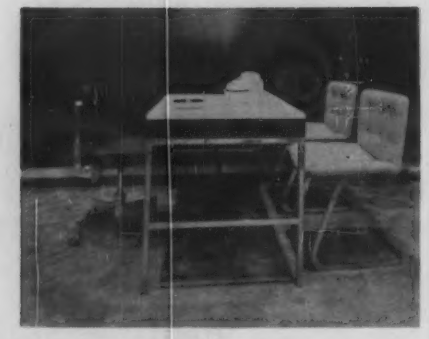


Door handles and graphics were specially designed. Entry has a stainless-steel "push" plate.



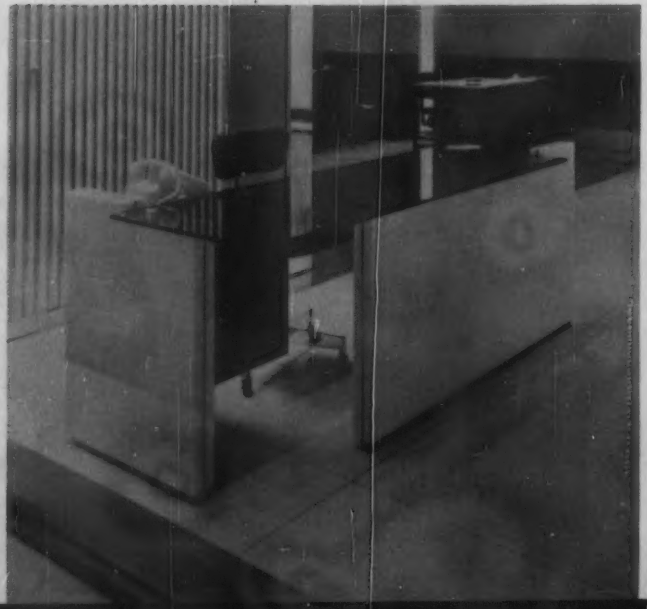
The corrugated steel lobby door repeats the black plastic "pull" bar on the glass entry door.

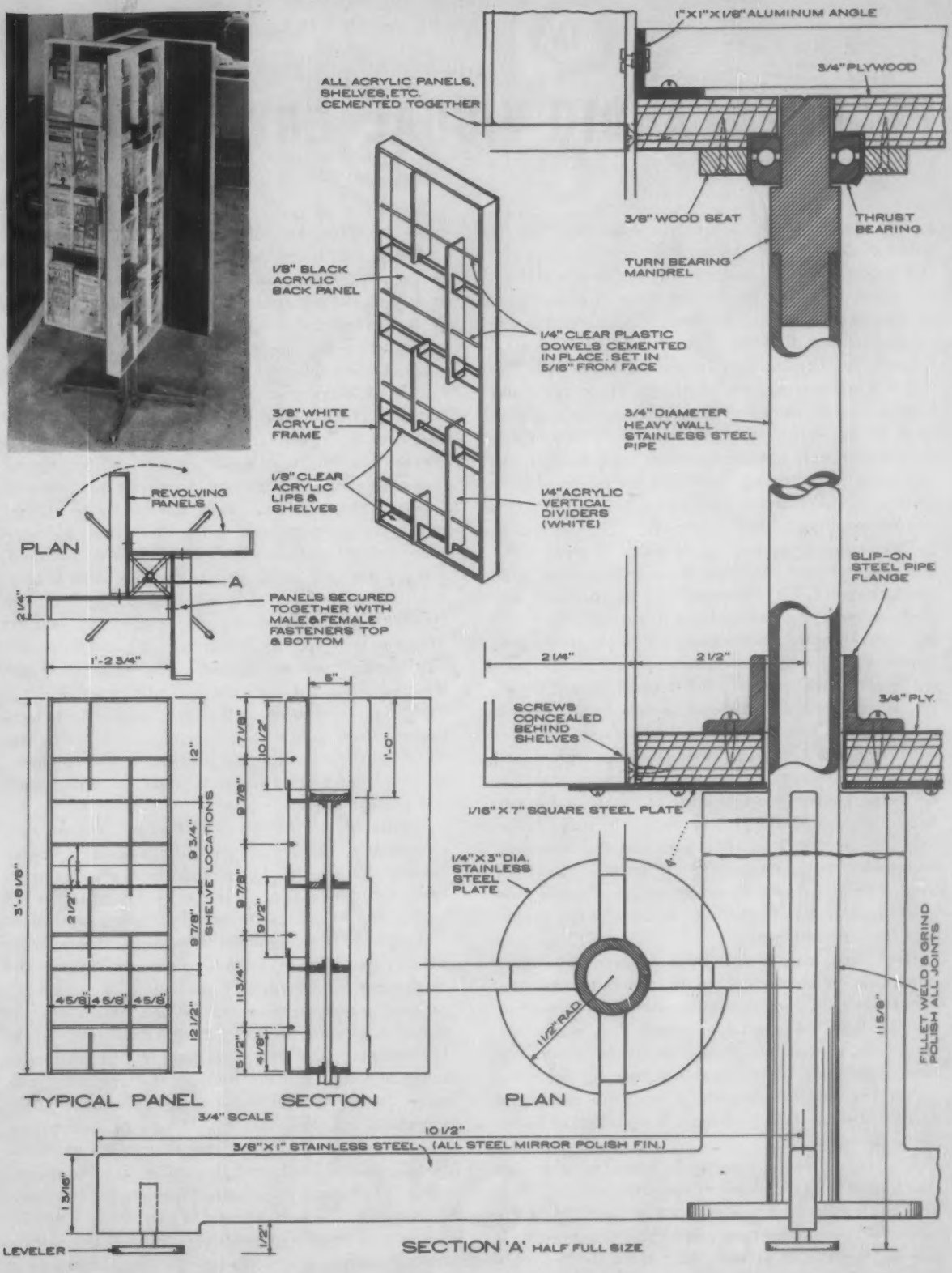




Desks for agents (above *and* left) *are an improvement over the customary counter arrangement. A step-down level for catalogues permits a tidy desk top. Adjacent Brazilian rosewood wall cabinets, which store additional flight information, have rosewood interiors so as to present a finished appearance when the doors are open and the cabinets in use.*

The reception desk (right *and* below) *is an elegantly playful piece of furniture. Standard desks have solid components where this desk is transparent; where they are open, this one is solid. Rosewood cabinets are cantilevered from perpendicular white marble slabs anchored in the floor; the top is gray glass placed off center.*





AIR FRANCE TICKET OFFICE: New York, N.Y. THE SPACE DESIGN GROUP, INC., Designers	SELECTED DETAIL REVOLVING BROCHURE RACK

PLANNED AUDIO-VISUAL ENVIRONMENT

In our frenetic space-age world, we are kept acutely aware of: (1) the urgent, constant need to communicate with each other, and (2) the highly effective instruments, including the full spectrum of audio-visual devices, that are at hand for the accomplishment of this communication. Pondering these verities, Thomas J. Watson, Jr., President of International Business Machines Corporation, said recently: "There never has been a time when more information was available to more people than at the beginning of this promising decade. Not only are more people doing more things that are worth knowing about, but the means of communicating information have never been so effective and far reaching as they are today."

The design of appropriate physical housing, however, has not kept pace with the development of these new techniques. With few exceptions, new tools and new methods are being cramped into shoes that do not fit—into rooms that were not planned for the purpose or that were designed with inadequate allowance for the present level of development of the audio-visual art. This is true of the formal classroom and lecture hall, for education is, after all, basically the communication of knowledge, and it is at least as true—probably a great deal more so—in industry and commerce. Millions of dollars are being poured into new office buildings and executive suites incorporating the ultimate in light and acoustical engineering, traffic-flow planning and functional design—but with little or no regard for the opportunity to provide an integrated, permanent, yet flexible communications system in such key areas as board, conference, and training rooms.

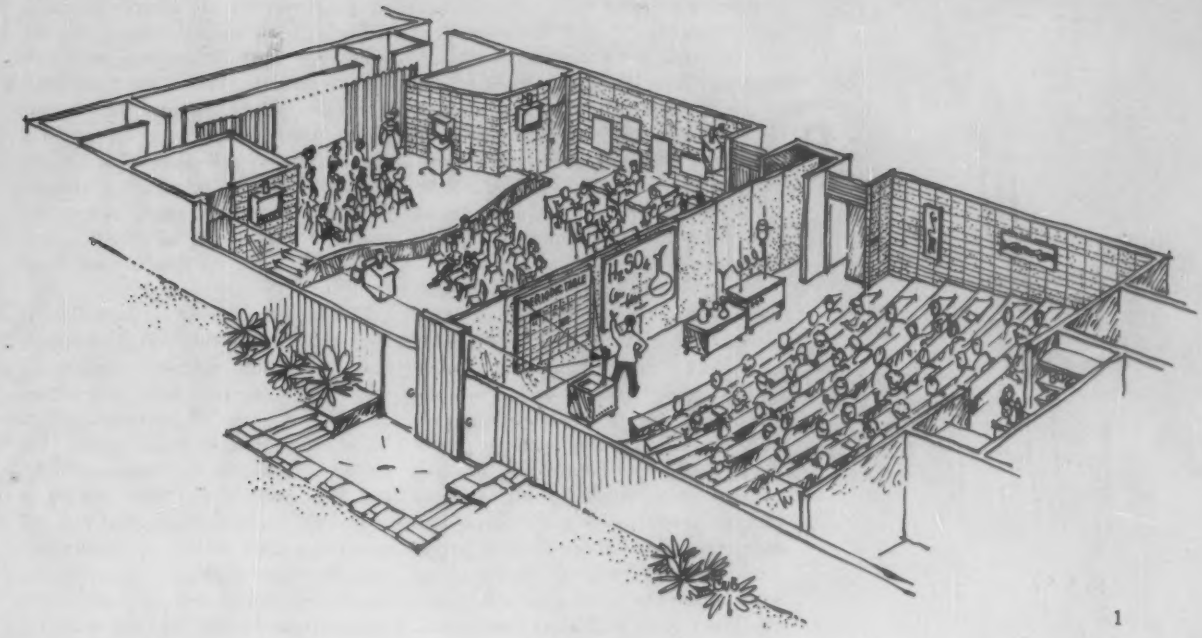
Here, then, is an architectural challenge of primary importance—the design of specific spaces to accommodate today's and tomorrow's communications devices—toward which this special section of P/A is directed. Obviously, it is almost impossible for the architect to keep abreast of all developments in the many fields that to varying degrees affect the competence of his end product. One of these peripheral fields is that of audio-visual devices.

In part, the design lag may be traced to misunderstanding of the capabilities of modern aural and visual aids and media—and to a plethora of conflicting theories and philosophies concerning their employment. It has not been until recently that these devices were thought of in terms other than as individual tools. What is new is the concept of a total system combining a variety of such devices into an effective whole. New schools, factories, and office buildings could not wait, however, while the audio-visual art was sorting itself out. The traditional path has been the path of least resistance. "Audio-visual" has meant some miscellaneous pieces of equipment—slide or motion-picture projectors or television sets—to be moved from room to room, set up and operated haphazardly, and hidden in a closet when not in use.

A notable exception has been the military establishment, where the need to communicate, analyze, and understand vast amounts of complex information has literally been of life or death urgency. Briefing rooms, command posts, training programs live constantly with this need and have trail-blazed many of the techniques now becoming recognized in the educational and business worlds. To cite only one example: the Army found, a few years ago, that it was taking 15 months to train missile specialists for fairly routine jobs. The Ordnance Guided Missile School, applying audio-visual support programs developed by TelePrompTer Corporation, cut the training time to less than a year—and found that understanding and retention markedly *increased.*

Civilian application of the integrated systems technique, however, is gaining momentum, and the business world is also recognizing the advantages of a completely self-contained facility for management communication and presentation.

Inevitably, the architect will become involved with an increasing number of commissions requiring the inclusion of audio-visual communications systems in his designs. His attention, therefore, is invited to the following articles, which include contemporary solutions in the fields of education and industry that indicate what progress has been made to date. In "Spaces and Equipment for Education," the author spotlights significant communication trends now identifiable in school design and illustrates them with a survey of the latest communication spaces and related equipment found in today's schools. Rensselaer Polytechnic Institute's School of Architecture has just completed the important DASFEE Report (Design of Auditorium-Studio Facilities for Engineering Education) sponsored by Educational Facilities Laboratories, Inc. An investigator for this study discusses "Criteria for Collegiate Environment," which is based in part on the DASFEE Report and on his experiences related to that investigation. The last article of this series, "Communications in Industry," written by a pioneer in electronic communication, endorses the concept of rear-screen projection for executive offices and conference rooms as an extension of the executive's own powers of expression.



1

Spaces and Equipment for Education

BY PHILIP LEWIS

As educational theory has developed toward more effective teaching-learning processes, so too has the technology that makes possible new physical facilities and devices. This survey of advanced communications spaces and equipment for schools is written by the Director, Bureau of Instructional Materials, Chicago Board of Education.

In an address before the Audio-Visual Education Association of California, Dr. Edgar Dale of Ohio State University said: "We need a new image of the classroom teacher. His role will diminish as a presenter of information and will sharply increase as a motivator, an organizer and guide of pupil experiences coming from many sources. . . . It is likely that in the future we shall think in a less stereotyped way about class size; we shall focus more on the individual as a learner and let him proceed more often at his own speed."

The changing roles of both teachers and students, as explained by Dr. Dale, imply many modifications and innovations in educational technology, and, of course, the structures in which they are housed. More effective communication in the teaching-learning process requires the ready availability of pertinent facilities in a plant designed for their optimum use.

We often give lip service to the need for convenience in the use of various media in instruction, but not till recently have substantial steps been taken to implement this vital principle. Much of the delay comes from reluctance to deviate from traditional approaches and the fact that technology is only now providing the tools and devices necessary to accomplish the objective.

It is important to differentiate between gadgetry for gadgetry's sake and the use of facilities that are truly integral in the learning process. Certain trends are now identifiable in the educational field that can only be met through the enlightened application of available techniques, installations, and physical facilities.

Flexibility in the Classroom

Former ratios of fixed numbers of students per teacher are no longer considered effective in all learning situations. In some instances, it is desirable for a teacher to work with a single student. On other occasions, small groups are indicated, and many times it is necessary to involve one or more classes in a common experience. Also, the concept of team teaching is gaining acceptance.

The Dundee Elementary School, designed by Architects Perkins & Will and now under construction in Greenwich, Connecticut, has been planned for team teaching as well as for major grouping of pupils. Instead of conventional grade separation in rooms, the school consolidates kindergarten through second grade, third and fourth grades, and fifth and sixth grades. The auditorium (1) can be utilized either by a single group or by two separate classes. Offices are furnished for each team of seven to eight staff members, with adjacent rooms for use with small groups of pupils.

The new Chicago Teachers College, also designed by Perkins & Will, carries the concept of room flexibility even further. Over 200 individual Q-spaces are provided for advanced students, and other teaching locations are equipped with

movable, soundproof walls furnished with push-button controls (2). The design permits variations in accommodation: groups can range from 15 students to 30, 60, 90, 150, or up to a full auditorium situation for more than 750 persons. Throughout the structure, teaching spaces are uniquely designed as elongated hexagons, a form intended to maintain a well-proportioned and acoustically acceptable facility regardless of size.

It is appropriate at this point to discuss the new "Acousti-flex" folding room divider. Developed through the combined efforts of the School Equipment Division of Brunswick Corporation and the Mohasco Company, it results in complete audio privacy to groups on either side of the wall. The sound-retardation qualities of the fabric employed are achieved through specially designed woven lead wire and synthetic fibers. Sound is further isolated through the use of sound traps and seals around the entire area of the opening. The product is of heavy construction, with good rigidity and little sway, and recesses into a wall pocket or enclosure approximately 20 per cent the length of the full opening.

In an attempt to illustrate an ideal classroom of today, the Brunswick Corporation has created a room designed for primary children (3). This layout is oriented to a corner which contains the teaching and electronics control center; the room is outfitted with movable, modular furniture which can be regrouped easily to fit the needs of various teaching-learning activities. A ceiling-suspended TV receiver and a rear-projection screen are located in the corner, and are operated by the teacher through remote control. Transparency images of many varieties are projected from equipment on a shelf behind the television set.

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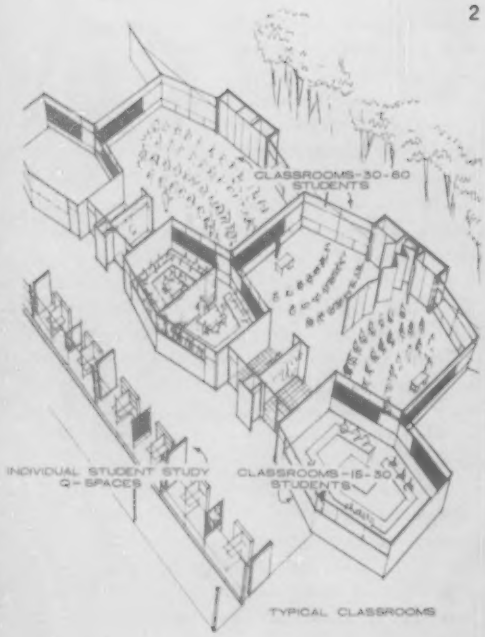

Instructional Materials Centers

This growing concept is a consolidation of library, audio-visual, television, teaching machine, and materials-preparation facilities. Depending upon the size of the institution and the levels of instruction, the center may be housed in a single room or can be distributed among several locales. The following examples of these installations are indicative of advanced trends.

At the University of Miami, the new University College Building is a boldly conceived audio-video center by Architect Robert Fitch Smith (4). It is unique in its combination of aural and visual aids to instruction and in its function as a laboratory for research into advanced training methods. Total seating capacity of the building is 2400, divided into eight 300-seat classrooms. (Two of the eight large rooms are subdivided into three rooms with a seating capacity of 90 students each.) The wedge-shaped spaces are arranged octagonally about a central-projection core from which images are projected, rear-screen, on a 10-ft square surface located at the apex of each classroom.

The lecture platform for each class is located to the students' left. The lectern is equipped with complete controls for room light-level, audio-level, and remote control of a variety of projectors, including television images produced live in a studio contiguous to the classroom building. It is possible for 2400 students to receive simultaneous instruction by closed-circuit television, or for any combination of classrooms to receive individualized instruction through television and other audio-visual devices. For convenience, lectures and demonstrations may be recorded on video tape for subsequent release over the CCTV system. Currently in progress are plans for an audience-response system serving each of the 2400 seats with electronic devices capable of conveying 31 different student reaction responses to the instructor. These responses will be recorded for either immediate or delayed analysis.

TelePrompTer Corporation, utilizing a different approach, has installed several of its "Telemation" facilities in military establishments and is now placing others in educational institutions such as the University of Wisconsin (5) and the University of Texas. This facility takes the form of a multiscreen arrangement for rear-screen projection. Designed for use with large groups of students, it is usually located in an auditorium or large study hall. A center screen section plus two or four auxiliary screen sections are erected in front of the stage of the assembly room. In operation, the center screen carries the main theme of the instruction, and at appropriate times the auxiliary screens come into action to reinforce a concept, to clarify a term, or to provide a close-up.

All projection units (including any combination of 16 mm motion picture, 2″ x 2″ slide, 3¼″ x 4″ slide, filmstrip, and television) are located behind the screen area. Multiplexers are provided to permit rapid interchange of equipment as required. A system of punched cards and automation devices switches the machines in and out of operation on electrical cue

from a roll containing the lesson script. Controls at the lecturer's podium permit the teacher to pace the lesson, to deviate from the script as desired, and to control the lights, sound, and other environmental factors. "Telemation" is an effective method of providing instruction for large groups of students, as in foundation courses normally presented as lecture sequences. The content and visualizations are scientifically programed by a team of educators, graphic artists, and technicians to insure optimum results.

The Wireless Microphone

In planning for public-address facilities for the auditorium, stadium, little theater, or television studio, it is now possible to eliminate one of the greatest obstacles to good sound pickup. Under conventional circumstances, the speaker using a microphone mounted on a podium or placed on a table will invariably talk "off-mike" at least part of the time. The television teacher, or the teacher working in large-group situations, is often hampered and limited in travel by the trailing microphone cord.

The newly developed "Vegamike" is a compact unit about 1 in. in diameter and 5 in. in length. This item contains a miniature FM transmitter, microphone, and battery, with the cord around the wearer's neck doubling also as the antenna. With this unit, the performer or lecturer is completely free to move around while always being assured of optimum pickup. A receiving unit backstage is connected to the public-address input to complete the installation. It is possible to employ several microphones and receivers, each tuned to a different channel, if desired. The same system can be used on the athletic field, and a person on the 50-yd line can activate the public-address system without being anywhere near the amplifier input.

ETV and Closed-Circuit TV

The full potential of television for educational purposes is still to be achieved. The progress made to date can only indicate the great promise for the future. Actually, each new school building should be equipped with a coaxial-cable distribution system capable of performing a myriad of services. In essence, a total communications system must be designed in each instance. It has been common practice to contract for a master-clock and signal system from one supplier, but to deal with another source for the television network. In some instances, the impulses employed

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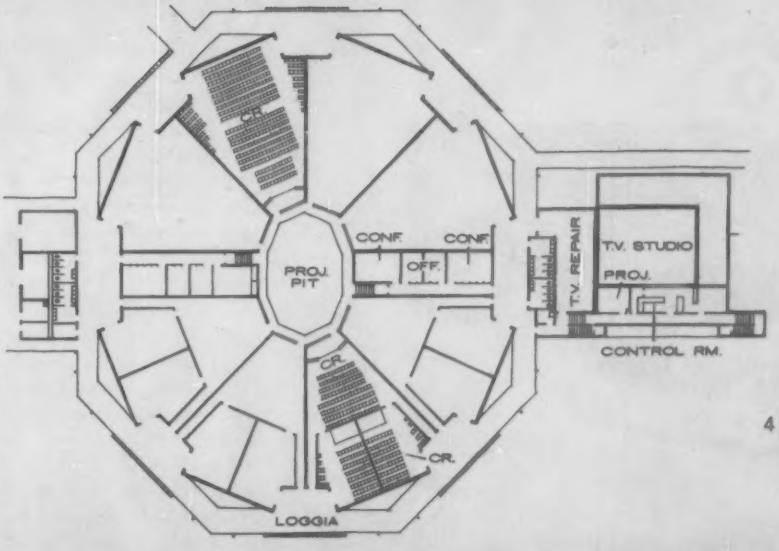

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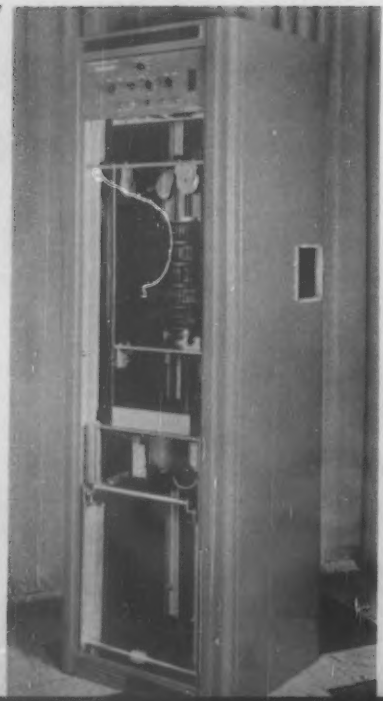

to synchronize the clocks were found to interfere with the transmission of the TV signals. This is but a single example of the results of uncöordinated planning.

A communication facility should include consideration of the following services:
1 Intercommunication between all pertinent rooms and locations.
2 Independent public-address installations in major locations such as the gymnasium, auditorium, swimming pool, athletic field, and similar facilities, but with co-ordinating links for over-ride with the central intercommunication system.
3 Coaxial-cable distribution network with at least six channels to handle both internally originated programs as well as externally received signals.

(a) Provision for central distribution of visuals through electronics.

(b) Provision for remote control of data storage.

(c) Provision for random access to classified reference information in the library or materials center.

(d) Provision for microwave tie-in with other buildings or institutions.

(e) Provision for remote observation of classroom activities for in-service purposes.

(f) Provision for multiple-class instruction through locally originated or externally received programs.

4 Audio programing channels to all classroom locations and learning areas. These to be connected to random-access devices to select tape and disc recordings according to code and from remote locations.
5 Fire and warning devices.
6 Clock and bell facilities.

In the recently completed East High School in Rochester, N. Y., designed by Architects Faragher & Macomber, a highly functional and imaginative facility is incorporated into their closed-circuit television installation. This is the Forum Room and Radio-Television Studio complex. Efficient use is made of the available space so that it functions in a variety of ways: the two studios can operate simultaneously for two-channel programing, and the Forum Room can also be employed as a workshop in training students in the mass media.

Where television will serve a group of buildings, a more ambitious facility should be considered. Here the TV Teaching Center provides areas for TV control and distribution, mobile pickup equipment, materials preparation, kinescoping and video taping, auditioning, previewing, and related activities. A functional example of this approach is the center at Hagerstown, Maryland. This building complex contains five studios in addition to the engineering and distribution facilities, and serves many of the schools throughout the county via a 100-mile closed-circuit cable network. The five channels of live programing, plus an additional channel for filmchain, permit transmission of lessons in sufficient quantity to be used at all grade levels. At present, consideration is being given to the addition of a transmitter to extend services to the community and for adult-education purposes.

Developments in Communications

The "Teletest Communications System" developed by Corrigan and Associates opens new horizons in the use of TV as well as in the emerging area of teaching machines. As a TV adjunct, the receiver enables the viewer of an ETV program (at home or in school) to become an active participant in the lesson.

The television receiver is fitted with a strip containing photocells. This is attached along the lower margin of the screen and covers about an inch of the horizontal viewing surface. A cable from this device is connected to a distribution amplifier and then to one or more "Student Record-o-paks" **(6)**. This latter unit contains a slot into which an IBM card is inserted. The studio teacher has access to a control box to activate a spot generator which modifies the transmitted TV image. In the course of instruction, a slide is flashed on the screen containing a multiple-choice question. The student presses the button on his unit to indicate choice of answer. If he is right, a green light appears in the aperture. If not, a red light appears and he must press another button until he gets the green light. Each time a button is depressed, a perforation is made in the IBM card.

After a reasonable time, the studio teacher activates a lever which advances all of the IBM cards one line and the system is ready for the next question. Thirty multiple-choice items can be handled by a single card. At the conclusion of the telecast, the classroom teacher presses the master control button and releases all cards for machine grading. More recent equipment incorporates four instead of three response buttons. Installations of this system are in the Anaheim schools and at San Jose State Teachers College in California.

The juke-box can be regarded as the source of the original random access and recall device for the storage of records. With some modifications to increase the number of programing channels, such

units can be placed in a materials center or communications center for audio distribution throughout a school building or complex of buildings. This approach will eliminate the need for clerical service and provide more efficient results. Along the same lines, the TelePrompTer Corporation has evolved a random-access slide projector (7), which handles up to 500 slides and can select and project individual transparencies within a few seconds after the proper impulse is received. Dr. Marvin Camras of the Armour Research Foundation has devised a method of stacking magnetic-tape cartridges so that they can be played automatically, as is now done with records.

All of these developments suggest that the day is near when automated depositories will be available in schools to employ audio and video for transmitting stored information to study areas, classrooms, and even to individual student study spaces. For several years now, the University of Virginia has operated a closed-circuit system enabling buildings on the campus to be remote viewing stations for library reference works which are placed before the TV camera in response to a telephone request.

It has been suggested that the library of the future will have connecting lines to an international depository of information, which will supply material (via TV and facsimile resources) that could never be available to the smaller libraries and perhaps not even to some of the larger ones.

The exciting development of the language laboratory has significantly affected instruction in this important area. Through the consolidation of equipment components, such as the tape recorder, phonograph, projectors, microphones, and headsets, into an integrated instructional system, an unlimited opportunity to individualize instruction is provided even when dealing with large classes.

New designs and advanced circuitry as applied to this field is perhaps best illustrated by the lab in which the individual student booth is fitted with ony a headset-microphone unit, a volume control, and a dial identical to that used on the conventional telephone. In operation, the student activates the booth controls, selects any one of hundreds of random-access prerecorded lessons, or contacts the instructor when necessary. Standard telephone cross-bar equipment is employed to help automate the system.

Experience with the laboratories to date indicates their early evolution into the form of the more general learning laboratory for use with virtually every subject or learning area, and also as a programing and communications center for a school. Tie-in with closed-circuit TV and teaching machines will be a further step.

A breakthrough in data-remoting processes has been made by the A. B. Dick Company with its development of the "Videograph System." This unique process employs an electrostatic printing tube which is a modification of the conventional TV picture tube. In use, a paper surface is brought in contact with the face of the tube to receive the electrostatic image of whatever is picked up and subsequently transmitted by the originating television camera. From here the paper moves up to the next stage where positively charged and pigmented resin particles adhere to the image. The final step is heat fusion to result in a permanent opaque copy. The duplicating unit can turn out three 8½" x 14" opaque copies of transmitted images, data, or graphic material per second. The future applications of the system for education seem limitless.

The intense interest and activity current in the field of teaching machines and programed learning may well be illustrated by an experiment now being conducted by System Development Corporation, Santa Monica, California. This company established a "Computer-based Laboratory for Automation in School Systems." The class facility incorporates an administrative area, combined observation and counseling area, and a large classroom that can be divided into two smaller classrooms. At each student position are the "Student Teaching Components," while the instructor's desk is equipped with a control console.

In general, closed-circuit TV and the computer will be employed along with scientific programing to determine important ways in which instruction can be individualized for each student—the teacher modifying sequences for the student based on regular checks of progress, and the computer itself modifying presentations automatically as a result of the success or failure of student responses. In addition, administrative problems of schools as well as guidance needs will be studied to ascertain what contributions can be made to improve instructional methods and the entire operation of the school.

Just as the future holds great promise for education, so does it hold an even greater challenge for those who create the environment within which education takes place.

Criteria for Collegiate Environment

BY ALAN C. GREEN

On literally every college campus in the country, the process of instruction is undergoing constant experimentation, resulting in changes that directly affect the planning, design, and even the basic concept of college facility types. The architect, deeply involved with the continuing innovations in other building types, also struggles to keep up with the trends in education. The jargon is unique and the valid trends are even more difficult to assess and evaluate. One of these trends and its effect on defining one facility type is discussed in this article by an Assistant Professor of the School of Architecture at Rensselaer Polytechnic Institute.

The author had been an associate investigator for a special study sponsored by the Educational Facilities Laboratories, Inc., and conducted by Rensselaer's School of Architecture. A report of this study, "New Spaces for Learning—Designing College Facilities to Utilize Instructional Aids and Media," has recently been published and the author has drawn on his association with that study for many of the viewpoints and all of the illustrations presented here.

Much of the impetus for current experimentation in instructional methods stems from the intensified training required throughout the military during World War II. Experimentation and change have continued, but under somewhat different urgencies. Today, they are forced by the much-heralded increased college enrollments, the shortage of faculty and facilities, the fantastic volume of knowledge that must be transferred to today's student, the increased emphasis on science and technology with their unique problems of instruction, and the general awakening of the American public to the tremendous needs of education and training. The process is being undertaken with two broad goals: to increase the quantity of education through increased efficiency of instruction, while constantly raising the quality of education to ever higher standards. One of the approaches has been the increasing use of instructional aids and media.

Technical Devices

"Aids and media" is a collective term describing a number of technical devices, some old and familiar, some new and still undergoing development. It includes the projection techniques: motion picture, slide, film-strip, film-loop, overhead, and shadow projection; large-scale models and demonstration apparatus; charts, graphs, and visuals; audio tapes, records, and radio; "teaching machines"; and that great common denominator, television.

Depending on its manner of employment, a device may be either an aid or a medium, and some devices, under varying conditions, may be both. The aid supports the instructor during the instructional process by presenting or helping to present supporting and expository material; the medium carries the initial burden of instruction, for a given period of time, during which the classroom instructor may play a secondary role. For example, the overhead projector, by enlarging an image and projecting it on a screen surface, aids the instructor in his presentation; a motion-picture projector, on the other hand, may show a film which conveys a complete unit of instruction with the instructor acting in an introductory and summary capacity. Television, depending on its momentary use, may be either. Ideally, several of the devices are used together as a system, with each playing that particular role in the instructional process for which it is best suited.

The concept and design of the facilities in which aids and media are utilized to a great extent in the teaching-learning process are quite different from those for the conventional classroom. In fact, the optimum use of instructional aids and media requires new concepts of space types and their design.

Space Types

There are three over-all categories of space types housing the broad instructional system which incorporates aids and media; they are the instructional spaces, the production spaces, and the access and review spaces. It is primarily the first, the instructional spaces, with which this discussion will be concerned.

Production facilities, the second type, covers that wide range of spaces which must be provided for the production of the instructional materials used with the aids and media. These include the production of slide and film materials; audio tapes and records; film loops and strips; slides for both the slide projector and the overhead; production of graphs, charts, and other art work; assembly of demonstration apparatus, and models; and the origination, distribution, and control of instructional television. The design of facilities for the latter, alone, involves a whole new facility type.

The third type, the access and review spaces, is based on the concept that when the instructional process includes technical aids, resulting in the possible loss of individual direction and supervision, the materials used during the course of presentation should be made available to the student for review and further study. This facility incorporates a library-type function—the collecting, cataloging, and distribution of any films, slides, kinescopes, tapes, and other "nonprinted" materials. These, along with the book materials, extend the range of student review, initial study, and individual exploration. The design of this third category is largely dependent on the development of electronic access-distribution systems and further refinements of easily operated individual and small group projection equipment and monitors.

Instructional Space

To return to the instructional facility itself, the concept of its function is basically this: the professor is provided with a variety of technical devices which he may call on as desired to present supporting material, aid his presentation, or carry the burden of instruction. These devices may be brought into the instructional process by the push of a button or may be activated by a preprograming punched tape or card. The combination of devices and the duration of use of each one during a presentation are unlimited. The spaces support a multimedia function—slides, film materials, television reception, audio tapes, radio, and others which may be called up during one period of instruction—and their individual roles will overlap. Thus, during an experiment televised from a laboratory and received in a classroom, a slide showing the ultimate result of the experiment may be held on a projection screen for comparative reasons. Or an outline, developed by the professor, may be thrown on one screen by the overhead projector, while an adjacent screen shows a motion picture amplifying the points on the outline. The professor is in control, but has at his disposal a vast array of technological assistants. In turn, the design of the instructional facility must, in every possible way, support this process.

In its simplest functioning, the conven-

tional classroom for lecture-recitation has a number of relatively fluid areas for student attention: a large expanse of chalkboard, areas of tackboard, varying positions for charts and other visuals, and an instructor who moves at will about the space. The "display areas" are many and varied; their relationships to the student in his seat are not highly critical. However, in facilities where the utilization of aids and media is an important function, the student-display surface relationship is highly significant. The various screen surfaces and monitor faces occupy fixed positions; the material appearing on these surfaces is usually highly critical and demands ready comprehension; and the student's attention is directed at the surfaces for long periods of time. These three considerations begin to imply some requisite design criteria.

Design Criteria

Each student must have a clear, unobstructed view of the various display surfaces. The view should be obtainable without craning or requiring odd body configurations. In rooms with more than three or four rows of seating, this would suggest stepped or sloped floors, although a steep slope is not essential for good viewing. Staggered seating further improves the sight lines.

The appropriate viewing area for the display surfaces is a function of the size of the projected images, and is defined by a minimum dimension, a maximum dimension, and a viewing angle (1). These dimensions and angles will not only vary with screen size, but will vary with the type of screens or monitor surfaces, the brightness of the display surface, the duration of presentation, the size, clearness, and contrast of the symbols appearing on the screens, and the need for ready comprehension. It is particularly the matter of symbol legibility that often goes unheeded. For the student in the seat most distant from the screen, a figure appearing on the screen would subtend an angle of nine minutes with his eye. In real terms, if the most distant student is 32 ft from the screen, the minimum symbol size should be one inch. Obviously, the production process (making of the film or the slide or the originating of the television broadcast) relates directly to the proper comprehension of the material appearing on the screen in a given room. In broad terms, for a matte screen under "normal" conditions, the minimum distance is 2w (w equals width of image), the maximum distance is 6 to 7w, and the angle is 40 to 50 degrees measured from the edge of the image. For multiple images, the determination of the viewing area is more involved (2). Due to the nature of the TV image, a slightly different set of standards comes into play when viewing a television image. The minimum is 4w, the maximum 12w, and the viewing angle a total of 80 to 90 degrees measured from the center of the screen. For periods of long presentation, one additional dimension is critical, and that is the angle of elevation of the eye of the student to the display surface (3). The tangible results of an excessive angle are stiff necks and eye fatigue. In smaller spaces this will rarely be critical, but in large spaces where a number of television monitors are suspended from the ceiling, high enough to avoid interference with other display surfaces, the problem is very real. In fact, the location of a number of monitors in a large instructional space has never been entirely satisfactorily accomplished.

Once these relationships of image size and viewing area have been established, resulting in the definition of a particular viewing area, the actual capacity of the space becomes a function of the seating type and its arrangement. Fixed seating appears most logical, particularly in the large space where the possibility of free rearrangement of furniture is negated by the stepped or sloped floors. However, the typical fixed auditorium-type chair with a folding tablet-arm has the serious limitation of insufficient writing surface. A solution is continuous table surfaces with fixed, pedestal, rotating chairs. This arrangement reduces the maximum capacity of a space over that possible with the auditorium-type seat; however, it is essentially a modified continental scheme so that some codes will allow the rows to be longer than 14 seats, and the aisles can

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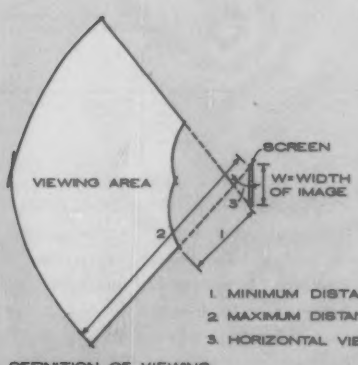

1. MINIMUM DISTANCE
2. MAXIMUM DISTANCE
3. HORIZONTAL VIEWING ANGLE

DEFINITION OF VIEWING AREA FOR SINGLE IMAGE

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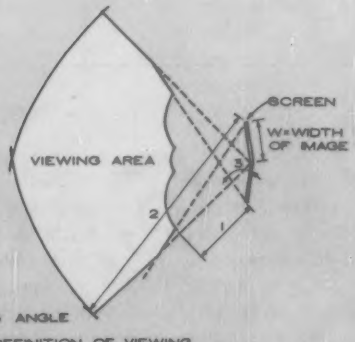

DEFINITION OF VIEWING AREA FOR MULTIPLE IMAGES

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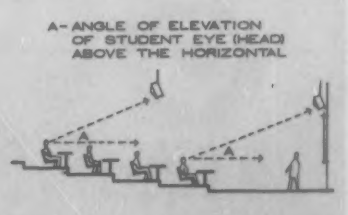
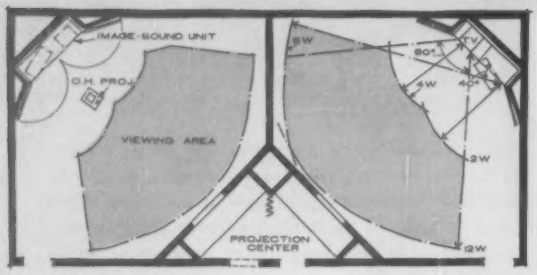
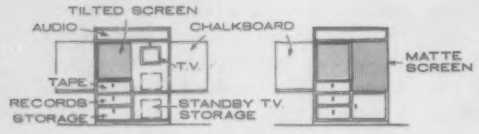


ANGLE OF ELEVATION—INDICATING THE PROBLEM OF LOCATING MONITORS TO AVOID INTERFERENCE WITH OTHER DISPLAY SURFACES





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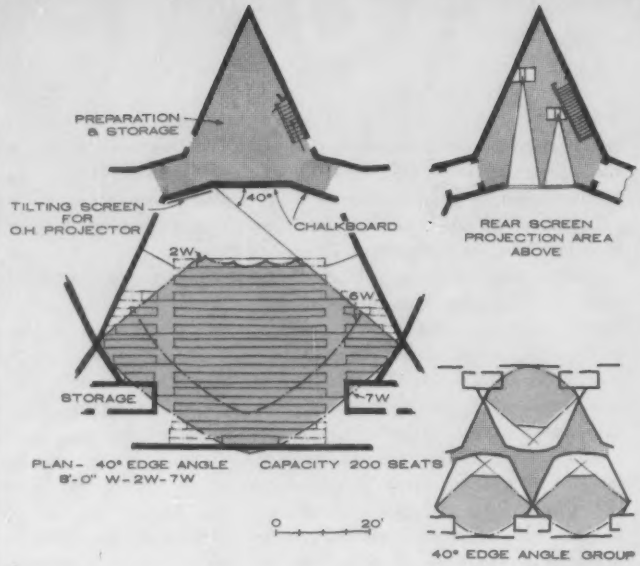

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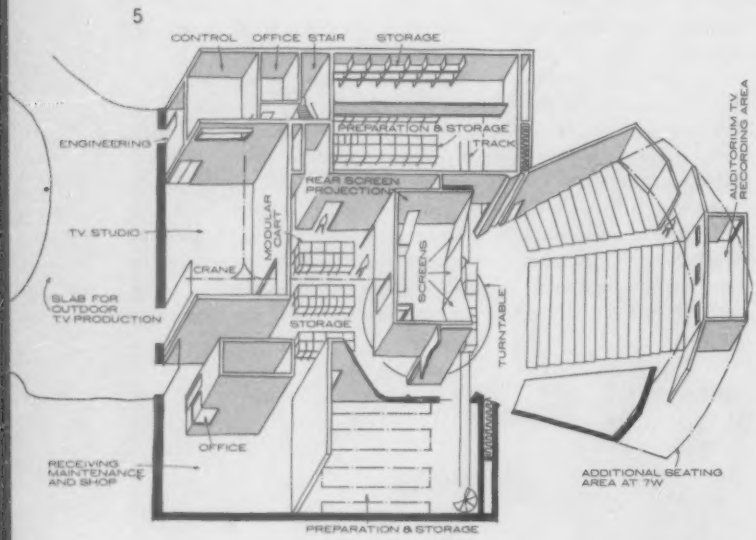

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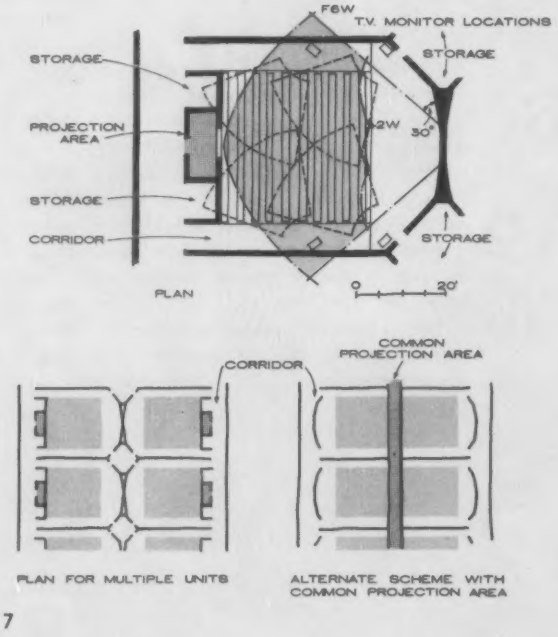

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then occur against the side walls and outside the optimum viewing area.

With a viewing area defined, and the student in an appropriate seat, next consider the required lighting. Regardless of the aid or medium being used, enough illumination should fall on the task surfaces to permit the students to take notes and to allow the instructor to maintain that important eye-to-eye contact. This concept discounts the room which is blackened when the motion picture or slide projector is turned on. Various techniques call for differing levels of illumination due to the differences in screen brightness and the effects of ambient light. The overhead projector with its high-lumen output provides an image brighter than the motion-picture projector, and much brighter than the opaque projector. In turn, the room illumination may be correspondingly higher. The source of the table-top illumination must be capable of a number of levels, each level compatible with the technique being used. The controls should be manipulated by the instructor, but should be preset as the instructor in the front of the room is not the best judge of the light in the audience area. In fact, the light controls can be co-ordinated with the equipment so that starting the slide projector, for instance, will automatically adjust the proper lighting level. Glare on

TV monitors and ambient light falling on projection screens are two lighting pitfalls. Both can seriously impair the definition of an image and can, in fact, render it unrecognizable. Therefore, lighting on the student desk surfaces must be carefully directed to prevent light falling on screens and monitors. Ceiling down-lights or closely spaced, highly directional egg-crate louvered fixtures seem the answer to lighting the desk surfaces.

Two other systems of illumination are necessary. Whenever the use of high-lumen output equipment permits it, or during conventional use of the room, wall and ceiling surfaces should be washed with light. In addition to visual relief, this light raises the over-all brightness level in the room. A band of shielded fluorescent tubes near the top of side and rear walls, or indirect or semi-indirect ceiling-hung fixtures can accomplish this. Secondly, auxiliary display lighting—for chalkboards, tackboards, demonstration tables, and the instructor himself—can be ceiling-mounted and carefully masked.

These criteria produce windowless facilities, for in every possible way the design of these rooms must support the most efficient use of the aids and media; natural light not only impedes and detracts but also is difficult to control. Visual relief is afforded the student as he moves from class to class and in the other, more conventional spaces he occupies throughout the school day.

With no windows and high concentrations of students and equipment, air conditioning becomes essential. Even during cold weather, cooling will probably be necessary after the first hour or so of occupancy. The problems are not unique; most importantly the equipment should be located away from the room, with supply ducts acoustically treated to prevent mechanical sounds from competing with the instructor, the motion pictures, the TV, and the tapes.

A consideration of acoustics has a number of facets. First, projection equipment should be sound-isolated by location in a projection booth, room, or cabinet. Secondly, sound isolation between instructional spaces is critical as the accompanying sound from a film may not be compatible with the presentation next door. Regarding the quality of sound within the room, correctly located reflective surfaces for sound dispersion and adequate absorptive surfaces for prevention of reverberation are essential. A single, quality sound system for the audio components of the instructional devices should be used, with the loudspeaker located at the front center of the room to provide realism. Except in very large auditoriums, the instructor should not be "wired down" and his own nonamplified voice should be able to reach all students. These critical acoustical considerations limit the use of many folding or otherwise "flexible" partitions between spaces of this type.

The question of front versus rear screen projection has many aspects and each has pros and cons which cannot be discussed in detail in this brief review. However, where the required extra space is available, rear projection does have inherent advantages: higher ambient light levels, and no masking of the image by student heads, the instructor, and related equipment. The use of mirrors (multiplexing devices) may often permit the advantages of rear projection without requiring the additional space. In any case, steps need to be taken by manufacturers to produce more equipment specifically for educational use and for specific types of installation. The case of rear versus front projection will often be settled from the standpoint of available equipment.

Finally, in these facilities the equipment, the display surfaces, and the controls under the direction of the instructor must be considered as segments of an instructional system. They are interdependent and function together toward the goal of student response and learning. It is not enough to locate a piece of projection equipment and a screen; the equipment is controlled and co-ordinated with other devices and the screen surface must be integrated with other display surfaces. These are facilities which support systems of instruction, not house single pieces of equipment (4).

Other Planning Considerations

With some of the design criteria for the individual facilities discussed, consider now several broader planning considerations. These facilities will not necessarily be identified on the college campus by the courses that will be taught in them, nor will they be at the disposal of, or administered by, a single academic department. The registrar will not identify them as physics, math, chemistry, or anthropology rooms. Rather, they are identified by a method of instruction, or better, a system of instruction—i.e., that system of instruction where to a greater or lesser degree the instructor is aided in his presentation, or the burden of instruction is accomplished, by technical instructional devices. In reality, then, the spaces are functionally flexible in the sense that their inherent design does not permit one discipline to the exclusion of others. A motion picture may deal with principles of surveying or the life cycle of the Drosophila. What appears on the TV monitor face may originate from a nuclear reactor or the stage of a Shakespearean theater; the slides may be of Renoirs or stress diagrams; the audio tapes may be of tribal chants or radio signals from space vehicles. The facility with its various equipment is a neutral vehicle; the films, slides, tapes, television broadcast, and teaching-machine programs are the materials of the course.

Following this philosophy of a facility type one step further, institutions may well find it economically and administratively advantageous to plan a building composed of this one facility type which will serve several departments or a college complex. An integral or adjacent part of the building may house production facilities—television and film studios, graphic arts studios, shops, etc.—as well as the administrative unit and service areas. Further, as a planning refinement to introduce more flexibility of use, the individual instructional spaces within the unit should vary in capacity to correspond with the variety of class sizes to be accommodated. Thus, further flexibility of use is achieved by scheduling the use of a facility that corresponds to the size of the group involved.

Still another planning corollary is important. The design and location of the auxiliary spaces requisite for proper functioning of the actual instructional spaces are equally significant. These are the preparation and storage areas, the film and tape materials storage, the workrooms for the support staff, the equipment maintenance areas, and the projection centers. Often these support areas will be amazingly extensive and complex and may actually dwarf the instructional area they "support" (5). Whether front or rear projection is used, the projection areas should be accessible from without the classroom itself, and if possible two or more areas should be contiguous. Thus, while classes are in session, one or more technicians can ready film materials in several projection centers for subsequent classes. The individual professor is free of mechanical wizardry, and high utilization rates of the spaces can be accomplished. The rooms do not lie idle while equipment is readied (6, 7).

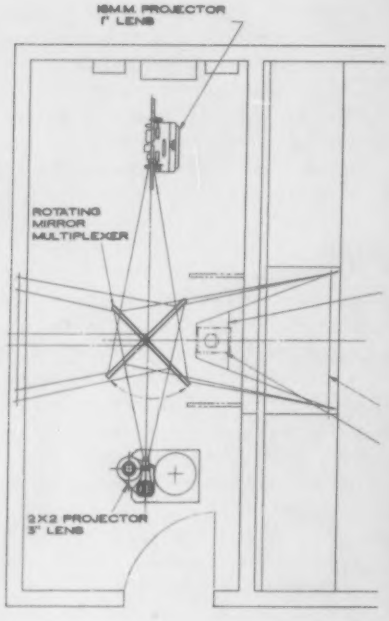
We have dealt here with only one of the new facility types appearing on the college campus. It is designed for a particular instructional system and its design must support the system in every possible way. They are expensive facilities; the improvements in the quality and the quantity of the instructional processes they house should justify their cost.

Communications in Industry

BY IRVING B. KAHN

Communicating in executive offices and conference rooms is vastly more efficient with the use of integrated audio-visual aids, and especially when coupled with the proven advantages of rear-screen projection. This concept of communications is discussed by a widely recognized authority on electronic communications systems of all sorts, the president of TelePrompTer Corporation.

Top photos (right) *of presidential office show flush walnut wall opposite executive's desk, appearance of projection screen after sliding panels have opened and disappeared from view, and an "all-stops-out" look at wall with other components exposed. This wall was designed by William Baker. Drawing* (below) *and adjacent photo indicate layout and location of equipment in 5-ft-wide room behind projection screen in president's office. Several images, both static and dynamic in nature, can be shown at one time on large screen in conference room by means of multiple rear-screen projection* (bottom).



Photos: Rodney McCay Morgan

In a recent informal survey, our company asked a number of top executives—members of the Young Presidents' Organization—how they spent their working hours. Three-quarters of them were frank enough to report that primarily they meet and talk with people. They are salesmen, on a high level, for their companies and their companies' projects. This was not an original discovery. Many contemporary executive office suites indicate this trend. Desks, if not eliminated entirely, are disguised so that often they no longer give the appearance of desks at all.

What interests us, however, as engineers and consultants in the field of group communications, is the important role that communicating plays in the life of the executive—and the implicit opportunity to augment his spoken message with all of the effective aural and visual devices that our electronic age has made available. The president or chairman unquestionably needs to show as well as tell his audience what he has in mind. The complexity of his communications problem is increased by the fact that he may be delivering his message to one person or to many. A technique that works well with a single auditor may cause the attention of a larger group to wander and its interest to wane. The executive's presentation tools must be more than pieces of hardware; they must be an extension of his own powers of expression. They should be part of a coordinated system: versatile enough to adapt to what he has to say; flexible enough to accommodate audiences of varying sizes; and, above all, unobtrusive enough to seem a natural part of the environment.

Communicating is not confined to the president's office, of course, nor to contacts with people outside his company; its

functions are both external and internal. It links every echelon of any commercial or industrial activity; it is the foundation of every contact with customers or prospects. Internally, it embraces such vital responsibilities as management-employee relations; training programs, whether for factory workers, salesmen, or executives; presentation of sales and advertising campaigns; analysis of marketing information; the president's communication of objectives and policies to his board of directors, management team, and stockholders; and—in an era of burgeoning international activity—the flow and control of all the information necessary to render operational decisions at home and abroad.

Thus the proper integration of communications devices and scientifically planned systems for information presentation is certain to be a major influence on planning and structural design. Just as today's building is planned to accommodate complex computing systems, so must we provide the means of circulating information thus acquired, making it readily accessible and understandable. Rarely, however, are total communications considered and adequately provided for. How often, upon being called in for consultation regarding an audio-visual presentation installation, have we proudly been shown an area designated but not designed for the purpose—with inadequate wiring, insufficient power supply, obstructed sight lines, and, in fact, no physical provision whatsoever for necessary equipment! Most large apartment houses being built today have television antennas. Yet to my knowledge, only in one or two of these has any serious thought been given to the "communications wall" concept that will allow large-screen television, motion picture and slide projection systems, hi-fi and audio-tape devices to be built into the apartment of tomorrow.

The two installations (illustrated at left) are typical examples of integrated, permanent communications / presentation systems. They are located in two of the most important communications areas—the presidential office and the board or conference room—although they could be found just as easily in dozens of other locations serving diverse functions. Although these two systems are in our own corporation headquarters, they are representative of the "communications wall" concept that is gaining favor in industry as well as in military, Governmental, and educational applications. Both systems combine—in variations tailored to the intended use—virtually the full range of modern audio-visual aids and media: slide projection, both 3¼" and 2" x 2"; motion-picture projection; and large-screen television, all operable by remote control. The slide projectors in the presidential office utilize a random access selection process which can call up at random, in forward or reverse sequence—within seconds and by merely turning a dial—any of 100 different pictures. A synchronized tape selector will simultaneously deliver an appropriate message with the slide.

These systems, as do almost all that we design, employ rear-screen projection. The architectural designer must have an awareness of this concept, since it affects his planning of space. Rear-screen projection is infinitely preferable, because it permits normal room lighting, insures that there are no shadows on the picture, and eliminates heat or noise from mechanisms within the room. A tremendous psychological advantage, as well as a physical one, exists when images can be produced upon a wall without the distraction of audible and visible projection equipment.

The projection screen (in top illustrations) literally fades into the woodwork when not in use, and disappears behind sliding, automatically operated doors that form part of a walnut-paneled wall. (That magic wall also hides a bar, hot plate, refrigerator, hi-fi equipment, clothes closet, and foldaway sofa.)

Generally speaking, although the small office screen is an exception, we believe that multiscreen presentations take advantage of the human brain's capability to react to and retain simultaneous stimuli. Placing several images on adjacent areas of a screen permits major categories to be retained at one location while small details are examined at another. Or it may be desired to hold a static reference (slide) while observing dynamic characteristics presented by motion-picture film or television. Our board room system is of this type, and it was not only planned to inform the board of directors of corporate progress and prospects, but also to be used by the management team for presenting and discussing ideas, programs, proposals, and related marketing and financial information. Although some companies may look askance at such a broad use of this facility, we believe that a fully realized presentation system can make this area, which is usually the most costly to maintain, one of the most productive as well. Such a system, of course, would defeat its own purpose unless it was easy to operate. A prime ingredient of the integrated system, therefore, is simplified control.

As it happened, our communications areas were not the product of original architectural planning, but had to be provided by altering existing layouts. It is significant that the rear-projection area in the presidential office has a depth of only 5 ft. This is considerably less than ideal, but is made adequate by the use of space-saving multiplexing devices, particularly mirrors and reflectors, that make it unnecessary for projection devices to face the screen, and allow several of them to utilize the same screen area at once.

The concepts discussed and illustrated here have evolved, for the most part, from the urgent requirements of the armed forces for better avenues of information exchange. In industry, there is a similar, ever-increasing need. As corporate activity becomes more complex, management must call upon the most effective means of communication. Kaiser Industries, American Airlines, Equitable Life, Chance-Vought, Humble Oil, S. C. Johnson and Son, Inc., are a few of the companies currently utilizing or discussing space and design facilities to accommodate an integrated audio-visual system for board, conference, and/or training areas. Architectural firms such as Skidmore, Owings & Merrill; Kahn & Jacobs; Nolen & Swinburne; Welton Becket & Associates; and Perkins & Will are among those that have made provision for such facilities in current projects.

The communications requirements of the 1960's will present an unfamiliar but exciting challenge to the architect and designer as management seeks new presentation techniques to keep pace with technological advances.

More on Penn Station

Dear Editor: It is with regret that I hear that Penn Station is being considered for demolition.

Although it is understandable that a city must make changes to meet new needs, careful consideration should be given to the removal of a handsome monument such as this one, since the spirit and life of a city are created by such distinguished buildings. A major change of this type should be made only after due consideration has been given to the historical significance and cultural implications involved.

MARIO J. CIAMPI
San Francisco, Calif.

Dear Editor: One can count on one hand the number of buildings in New York City which carry out architecture's prime role: i.e., to ennoble.

New York's Pennsylvania Station fulfils this role admirably, and to tear it down is an inhuman act of barbarism.

PAUL RUDOLPH
New Haven, Conn.

Dear Editor: It is extremely regrettable that a large public space such as New York City's Pennsylvania Station has to be torn down. Worse still, it is to be replaced by something of doubtful value on a site totally unsuited for such a project. Why does the "new" Madison Square Garden have to move from the "old" Madison Square Garden in the first place?

It is indeed unfortunate that a great city seems to have such an urgent built-in need for change—change for the sake of change. I am speaking of a frequent destruction of buildings that have charm, grace, historic interest and—yes—function. A not-too-sensitive visitor to New York City may see in all this tearing-down activity a vigor and vitality which really are not there, a sense of man's drive and accomplishment which is really false and misleading.

What a shame that we are on the way to erecting bigger and even more temporary mistakes than ever before. What an even greater pity that not many people seem to care.

E. N. TURANO
New York, N. Y.

Dear Editor: I believe that it would be an irreparable loss to destroy Penn Station, and find it hard to believe that the demolition is in any way essential. Surely the wealth of New York can provide new property enough and thus prevent the destruction of its heritage.

HENRY HILL
San Francisco, Calif.

Dear Editor: Why tear down Pennsylvania Station? The only obvious answer is that it is a piece of distressed real estate held in one ownership and therefore a sitting duck for opportunist development. In a planned urban renewal area, the new Madison Square Garden could co-exist alongside the Baths of Caracalla rather than be built on its ruins. It is simply a matter of economic logic, for to destroy this magnificent complex is wasteful, and denies history and the past glory of railroading, which ought to be preserved for better days ahead.

Railroads should not be encouraged to subsidize themselves by selling off their front yards. As public utilities, they owe their public a dignified and decent daily experience.

HARRY WEESE
Chicago, Ill.

Dear Editor: Instead of encouraging petition signers to confuse dubious values, an historic-aesthetic commission should be established that will help preserve buildings of real historic merit. Such a commission would also evalute the superiority, if any, of proposed replacements. In the case of Penn Station, the replacement is very questionable.

OLINDO GROSSI
Brooklyn, N. Y.

Dear Editor: I think that not only should the Pennsylvania Station and Concourse remain intact, but since there is sufficient open space behind this area, I see no reason why we should destroy one by one those structures which give New York City some buildings with the scale and spaciousness lacking in so many of the new structures. I am too sentimental about keeping old New York intact unless it adds to our environment; the Pennsylvania Railroad Station, I think, does.

I might recommend, while the campaign is on, that some method might possibly be found to reconstruct the rather handsome room of the Concourse that was so brutally raped with the installation of the "modernistic" ticket booths some years back.

B. SUMNER GRUZEN
Kelly & Gruzen
New York, N. Y.

Dear Editor: The contemplated destruction of the Pennsylvania Railroad Station and the erection on its site of Luckman's new Madison Square Garden strikes me as trading an old lamp for a new one in which there is no genie.

LOUIS I. KAHN
Philadelphia, Pa.

[*P/A contacted Mayor Wagner for a comment on the Penn Station issue. The following is his reply.*—ED.]

Dear Editor: In view of the fact that no proposal has been submitted to the City requiring official action, I do not think it would be appropriate to make any statement at this time.

Recently I appointed a "Committee for the Preservation of Structures of Historic and Aesthetic Importance." Mr. Geoffrey Platt of 101 Park Avenue is chairman of this committee.

ROBERT F. WAGNER
Mayor, City of New York

Dear Editor: After spending several years trying to save the Metropolitan Building in Minneapolis, I am inclined to say that Penn Station will go no matter what the profession thinks. We might better apply our efforts to establishing Federal, state, and city committees for the preservation of historical buildings with annual appropriations that would accumulate until a building or two might be saved.

. . . Penn Station is no longer needed, and to preserve it as a monumental anachronism simply will not work. *Find some reasonably sound use* for the terminal building, preferably one that will return some income, and then start a campaign to preserve the structure. In my opinion, it is hopeless to try and preserve it as a railroad station when it is no longer needed. I wish this were not true . . .

Potential public monuments should not be allowed to fall into disrepair; they should be made wards of the Government, with enforced and controlled maintenance. After 30 years of neglect, the Metropolitan Building requires, at minimum, a $1,000,000 expenditure to overcome delayed maintenance. Only a Government grant or public subscription can provide these monies, because it is economically unfeasible at this stage of deterioration to rehabilitate the building.

In short, I think it is too late to save Penn Station, but it is not too late to start a program of education and accumulate the funds and policies that may save future buildings.

ROBERT G. CERNY
Minneapolis, Minn.

Dear Editor: . . . [Both Penn Station and Grand Central Terminal] are owned and operated by private enterprise. There is no doubt, however, that by the nature of their use if not by ownership, these buildings must be regarded as public structures. Accordingly, it should be assumed that the public, through the City authorities, should take a stand on these matters. This is not feasible, however, because no legal tools are in existence that would allow the City government to exercise any influence.

If, as professionals, we are to take any stand on this matter, it is of impressing on the public, over and over again, that legal tools should be created.

What could these legal tools be? I suggest the following: (1) The creation of a master plan for New York which, by determining land usages in detail, would provide that areas occupied by important transportation terminals cannot be used for any other purposes. (2) Laws to protect buildings, as well as spaces of significant historic or architectural significance, from interference or destruction. It would be necessary, however, within the framework of our free enterprise system, that such protective measures have built-in measures that would protect the owner of such structures from unreasonable economic loss.

How such a system could work was excellently demonstrated when, through the action of individual citizens, Carnegie Hall was saved. The problem was only solved after the City of New York declared itself willing to purchase the building.

As long as the necessary tools do not exist for preserving important public, semipublic, historic, or otherwise important structures and spaces between structures, the protest against any project will have little use other than the psychological one of allowing the protestor to give vent to his feelings in public. To pick on the architectural and aesthetic qualities of the projected buildings is immaterial and therefore senseless. The role of all those interested in the qualities of our urban environment must be to fight in favor of legislation and master planning that will permit doing something about the destruction or desecration of existing important structures.

VICTOR GRUEN
New York, N. Y.

Praise for Kiesler Article

Dear Editor: Your piece on Kiesler [JULY 1961 P/A] is the best I've ever read.

It is full Kiesler and fascinating—a job that must have been difficult. Great work: don't stop.

WALLACE K. HARRISON
New York, N. Y.

Dear Editor: I was impressed by the extent and thoroughness of your article on Kiesler, and commend you on having done it.

The realm of pure design and basic ideas behind architecture deserves greater recognition and encouragement, as well as financial support. We need men like Kiesler, and men like you to promote this type of thought and work.

JOHN M. JOHANSEN
New Canaan, Conn.

A Distinguished Publication

Dear Editor: I believe publications are distinguished to the extent that their editors are distinguished. I think that PROGRESSIVE ARCHITECTURE is quite the finest thing in its field. Even the philosophic discussions you have been featuring lately make excellent reading, although, I must confess, some of it strikes me as being the purest twaddle.

The old black magic never loses its charm. Medicine men, priests, theologians, "Madison Avenuers," politicians, architects—all find the promise of a glorious deliverance marvelously useful, and perhaps this is as it should be. Could Frank Lloyd Wright have succeeded in getting as much built as he did without the endless stream of mysticism he uttered? Could Mies overwhelm his clients, as obviously he must, without convincing them of a splendid commutation to be performed right before their eyes? If Louis Kahn were to abandon his enigmas, could he maintain his present eminence? Would so many wish to listen to Buckminster Fuller if he were to speak with the clarity of an Abraham Lincoln? I suspect that the answers in all cases is no. Magic undoubtedly has its uses—in architecture as much as in any other endeavor.

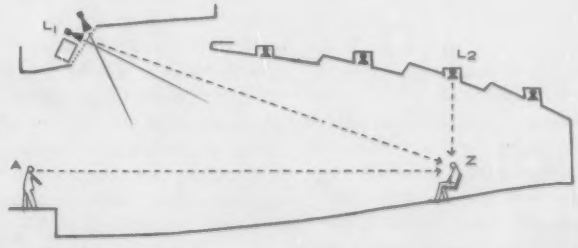
Be that as it may, I admire your magazine and offer you best wishes for your continued distinguished accomplishment.

C. H. GILCHRIST
Bedford, Iowa

The Speaker Stands Corrected

Dear Editor: Regarding your presentation of "Sound Systems" in AUGUST 1961 P/A, an error contained in the presentation concerns Figure 1. The purpose of this figure was to illustrate the advantages of a central loudspeaker system (labeled "Main Speakers" in the figure) over a distributed loudspeaker system (labeled "Supplementary Speakers"). A corrected version of this illustration is enclosed. Hope you can print this correction in a future issue, along with the caption.

DAVID L. KLEPPER
Bolt, Beranek & Newman, Inc.
Cambridge, Mass.



(1) Advantages of central-type loudspeaker system over a distributed type for reinforcement of a weak speaker in a well-designed auditorium. Distances A-Z and L_1-Z are approximately equal, but distance L_2-Z is much shorter. Use of distributed system (L_2) causes natural sound to be heard as an echo; sound energy of central system (L_1) reinforces that of person speaking.

The Architect as Arbitrator

BY JUDGE BERNARD TOMSON AND NORMAN COPLAN

Nassau County District Court Judge and a New York attorney discuss a recent decision by the Supreme Court of Arizona that attempts to distinguish between the architect's role as arbitrator and designer.

When the construction contract provides for the resolution of disputes between owner and contractor by the project architect, the latter functions in this respect in a semijudicial capacity. On the other hand, in supervising construction, he acts as the owner's agent. The duality of the architect's role and the complexity of his status can often engender misunderstanding among the parties concerned. A recent decision of the Supreme Court of Arizona illustrates the distinction which must be made between the architect's responsibility for acts performed as an arbitrator and acts performed as an architect. (*Craviolini* v. *Scholer & Fuller Associated Architects*, 357 P. 2d 611.)

In the *Craviolini* case, the plaintiff, a building contractor, had instituted suit against an architectural firm for damages alleged by the plaintiff to have arisen out of certain actions on the part of the architect. The board of trustees of the school district had entered into a contract with the defendant architect to prepare plans and specifications for a high school building, including structural, plumbing, heating, electrical, and other mechanical work. Under this contract, the architects agreed to supervise the work and to endeavor to guard the owner against deficiencies and defects in the work of the contractor. The school district also entered into a contract with the plaintiff-contractor for the construction of the high school for the agreed price of $2,424,900.

The contractor's allegations against the architect included charges that, because of errors in the plans and specifications called to the attention of the architect by the contractor, the architect had willfully, intentionally, and maliciously pursued a course of conduct which caused great damage to the contractor. The contractor alleged that the architect issued contradictory instructions to the plaintiff, changed plans and specifications without regard to the added cost or time schedule of the contractor, required the contractor to cover up and conceal the architect's errors and defects in the original design, delayed inspections, interfered with the contractor's performance by giving direct orders to subcontractors, arbitrarily refused to permit the contractor to use qualified subcontractors in certain phases of the work, withheld funds without justification, and by means of false representations attempted to induce the contractor's bonding company to take over the construction contract. For these alleged wrongs, as well as others, the plaintiff sought to recover $200,000 for actual damages, and $250,000 for punitive damages.

The defendant architect moved to dismiss the complaint, and the trial court did dismiss the complaint on the ground that "an architect is an arbitrator or a quasi-arbitrator and, as such, is immune from private actions against him for damages resulting from his actions as an arbitrator or quasi-arbitrator."

The issue before the appellate court on appeal was whether the acts charged by the contractor in his complaint related to the architect in the exercise of his function as an arbitrator, or to the exercise of his function as a designer and supervisor of construction. Discussing these roles, the Supreme Court of Arizona stated:

"The rule seems to be well settled that an architect who by agreement between the owner and the contractor is empowered to resolve disputes arising between them, acts, in resolving such disputes, as a quasi-arbitrator. As a quasi-arbitrator, he performs what is usually referred to as a 'quasi-judicial' function—whatever that may mean—and is clothed with an immunity, analogous to judicial immunity, against actions brought by either of the parties arising out of his performance of his quasi-arbitrator's duties. With that rule we have no quarrel . . . An architect may—and undoubtedly often does—act in his capacity as architect to settle differences arising in the course of a building's construction between the owner and the contractor. But he performs many other functions as well in carrying out his own contract with the owner. In performing those other functions, he departs from his role as arbitrator.

"The immunity in question here is one bestowed by public policy on those people who, by office or by contract, are called upon to act as judges. It is in every real sense a judicial immunity. It attaches to every act done in the judicial capacity, but to no other. Thus the architect has no immunity as *an architect;* immunity attaches only when he is performing those particular and limited functions which require the architect to act in the capacity of a judge. He may, in the construction of a building, assume many roles—planner, designer, supervisor, arbitrator, and owner's agent. In the role of arbitrator, and in that role alone, goes the cloak of immunity. In applying this principle, the court must look to the allegations of the complaint against the architect. If the tortious conduct with which he is charged is connected with and arises out of his determination of an owner-contractor dispute, he is usually immune against the charge. If, on the other hand, that conduct is remote from, and in no way associated with, the performance of his arbitrator's function, he is liable for it in accordance with the usual principles of tort law."

It was the conclusion of the Court that there was no showing that the architect was ever called upon to resolve any controversy between the owner and the contractor, and that the acts charged in the complaint were not performed by the architect in his capacity as arbitrator.

Is it actually necessary for the owner to be directly involved in a dispute with the contractor before the architect can perform his role as quasi-arbitrator? If not, the Court's decision is too broadly stated.

By and About Le Corbusier

BY JAN C. ROWAN

P/A's Managing Editor discusses three new books. Creation Is a Patient Search. *Le Corbusier. Introduction by Maurice Jardot. Frederick A. Praeger, 64 University Place, New York 3, N.Y., 1960. 312 pp., illus. $15.* Le Corbusier 1910–60. *Edited by Boesiger and Girsberger. Editions Girsberger, Zurich, 1960. Distributed by Wittenborn & Co., 1018 Madison Ave., New York 21, N.Y., 334 pp., illus. $15.* Le Corbusier Talks with Students. *Translated by Pierre Chase. The Orion Press, 116 E. 19 St., New York 3, N.Y., 1961. 88 pp., $3.50.*

On the flap of the jacket of *Creation Is a Patient Search* there is a subtitle, "A Self-Portrait by Le Corbusier," and the first sentence of the blurb reads: "This book is not merely by and about Le Corbusier—it *is* Le Corbusier."

That Le Corbusier insists on brandishing his personality in front of the public is not too fortunate. A man who has achieved so much in life should desist from calling everybody's attention to the monstrous chip on his shoulder.

His friend, Maurice Jardot, admits in the laudatory introduction to the book that Le Corbusier "does not have the open expression and the easy smile of those who readily inspire sympathy; animation and grace are lacking; the eyes are dull, the voice is flat and uneven," and that those who know Le Corbusier often talk of his "difficult character, aggressiveness, egoism, complacency and especially of a somewhat bleak attitude of mind making no allowances for doubts and shades of opinion."

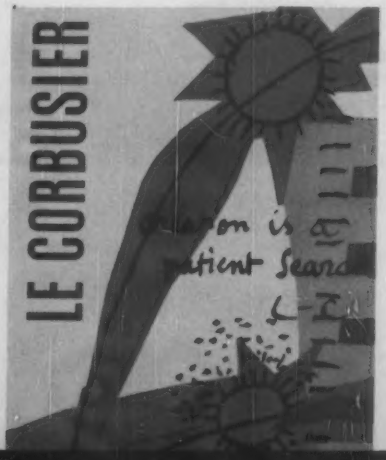
Such intolerance is not unusual in revolutionaries who wage a lonely fight against the world's opinion. On the contrary, it is a food necessary for sustaining one's soul during continuous battles; it is a vital stimulant to an occasionally faltering ego, and a powerful aphrodisiac in conceptive creation.

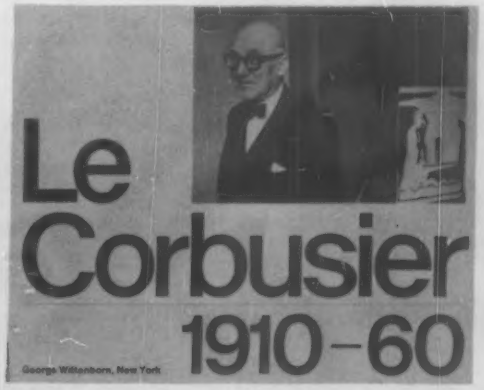
But playing the part of a monastic saint is a less common, quite unnecessary, and far more irritating ingredient. Most of those who have had the opportunity of meeting Le Corbusier cannot help being antagonized by it. Surely this has cost him many of the commissions about the loss of which he is now so bitter. Even Jardot, after saying that "according to [Le Corbusier's] own account, he begins every new day by comparing himself with the least of mortals, by the inexorable process of listing in his mind the qualities and aptitudes which he lacks," cannot resist adding: "... which no doubt occurs less frequently than he says."

One of the qualities which Le Corbusier lacks, and which he should have recited to himself every morning, but probably did not, is the quality of being less sure about both his own divinity and the wickedness of motives of those with whom he has to work. This classic case of a paranoiac tendency is evident throughout the book. Not only does Le Corbusier always write of himself in the third person; he also manages to boil everything down to a personal contest of one infallible superman surrounded by a sea of cretins, and he introduces a petty grudge into almost every paragraph and practically every caption in the book.

He recounts the League of Nations competition india ink story; the 1928 car

Continued on page 193





Heat-Gain Calculations

BY WILLIAM J. McGUINNESS

A progress and achievement report on the work of the Industry Heat Gain Joint Study Group, which is developing a unity for systems of heat-gain calculation, is made by the Chairman, Department of Structural Design, School of Architecture, Pratt Institute.

About 10 years ago, the great increase in air conditioning, especially its use in houses, signalled the need for simple and accurate methods of computing heat gains. The standard calculation method of the ASHRAE "Guide" is comprehensive and includes almost every contingency, but it is intricate to use and presupposes a great familiarity with the fundamentals of heat flow. Therefore, when the emergency arose, a great many systems appeared promptly. Some were good, some too simplified, and others couched in complicated technical language less comprehensible than the basic ASHRAE method.

In the movement to unify the several heat-gain calculation methods, the Federal Housing Administration, possibly the largest interested agency, did much to force a change. To demonstrate the urgency of this unification, an example was given of a house for which several calculations were submitted as part of an application for mortgage insurance. Heat gains varied from 20,000 Btu/hr to 42,000 Btu/hr, all based on the accepted calculation methods of respected authorities.

About two years ago, the three major associations serving the field of heating and air conditioning joined forces to produce a unified and correct method of calculation. The participants were the National Warm Air Heating and Air Conditioning Association, the Institute of Boiler and Radiator Manufacturers, and the Air Conditioning and Refrigeration Institute. Individual members of this newly created Industry Heat Gain Joint Study Group included, besides association representatives, university professors and experts representing leading manufacturers of air-conditioning equipment and insulation. The current report of their progress and achievement was written by Herbert T. Gilkey, Director of Technical Services of NWAHACA, and has been released concurrently by the three principal collaborating associations. At the time of this writing, it is being reviewed prior to approval by the members of each association. Final publication may appear this month. "The Problem," and some of the indicated solutions, are presented.

The Problem. The principal sources of sensible heat gain are: transmission, walls, roofs, glass, infiltration, occupancy. Some of the variations to be considered are: orientation of surfaces; design temperatures, outside; design temperatures, inside; daily temperature range; desired indoor temperature "swing"; light and dark surfaces.

Resources at the disposal of the study group, in addition to its own great experience, were the ASHRAE recommendations and data derived from heat-flow tests conducted over the years in three research houses sponsored by NWAHACA and two by IBR, all at University of Illinois. Space permits mention of only a few.

Walls. Equivalent temperature differences are listed for various wall constructions for outside air temperatures of 90, 95, and 100 F, for low, medium, and high daily outside temperature variations. Because wall colors can be changed easily, the difference in transmission through light and dark surfaces is averaged, making for simpler tables. Also quite a change is the decision not to recognize specifically the greater heat flow due to sun effect on a sun-oriented wall, but to average it in and make no distinction for the direction in which the wall faces.

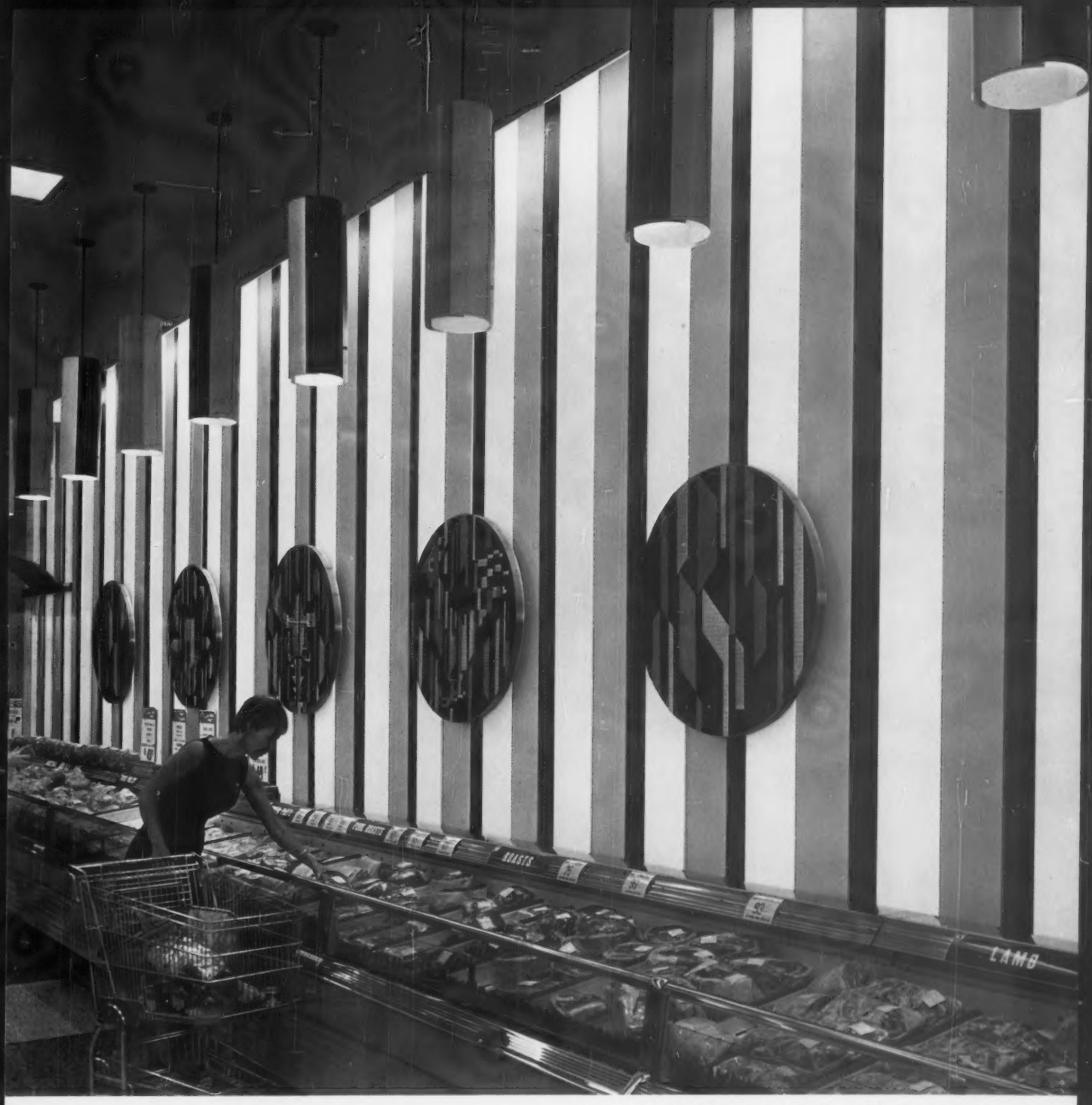
Glass. The solar effect made it impossible to divorce glass from its orientation and shading arrangements. It was also necessary to create two tables, one for the transmitted and absorbed solar energy, and one for air-to-air temperature differences. The former is written for single, double, and heat-absorbing double glass of various shadings and orientations. The latter is for single and double glass with the usual three outside design temperatures.

Infiltration. This item, always of less importance in summer than in winter, is settled very simply. It is assumed that all rooms have one-half air change per hour.

Occupancy. In this item also simple decisions are made. Each person contributes 300 Btu/hr and a kitchen 1200 Btu/hr.

Latent Heat. This is considered to add 30 per cent to the sensible heat gain. The latter is multiplied by 1.3 to find the total heat gain.

Temperatures. A temperature of 75 F is suggested. Whether to install a plant that can maintain a predetermined temperature or permit it to "swing" up as much as 6 degrees F has been discussed. Tables are proposed with multipliers for use if swing is 3, 4½, 6 degrees F. A smaller unit runs oftener and will help keep humidity low, an advantage to counterbalance the fact that room temperature may rise 6 degrees F during critical times of the day.



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New Term: Construction Documents

BY HAROLD J. ROSEN

A further proposal for the orderly arrangement of documents establishes the term "Construction Documents" as comprising three distinct elements: "Bidding Documents," "Contract Forms," and "Specifications." Author is Chief Specifications Writer of Kelly & Gruzen, Architects-Engineers.

Continuing our discussion of the "Tentative Proposals for a Manual of Practice for Specification Writing Methods" (SEPTEMBER 1961 P/A), we come upon a new term: "Construction Documents." In essence, the descriptive title "Construction Documents" is a new name for what was previously known as the "Specifications."

Actually, our "Specifications" contained an "Invitation to Bid," "Instructions to Bidders," "Bid Forms," "Form of Agreement," "Form of Bid Bond," "Surety Bond," "Performance Bond," "Wage Rates," "List of Contractor's Qualifications," "General Conditions," and finally "Specifications." Because of the varying practices of individual specifications writers and the lack of order and terminology of the material preceding the technical specifications, there has been complete chaos and nonuniformity in the arrangement of this portion of what will now be known as the "Construction Documents."

The "Construction Documents" will consist of three main elements: the "Bidding Documents," the "Contract Forms," and the "Specifications." This order stems from the use of two key words: "Bidder" and "Contractor." Since the term "Bidder" should be used only in connection with requirements relative to bidding and the making of awards, this term should be used only in the "Bidding Documents" and nowhere else. Since the term "Contractor" should be used only in connection with the requirements applicable to the successful bidder after he has been awarded the contract, this term should be used only in the "Contract Forms" and the "Specifications" of "Construction Documents."

The "Bidding Documents" will consist of those documents with which the bidder is concerned—namely, the "Invitation to Bid," the "Instructions to Bidders," and the "Proposal Form." Certain related documents that may be considered part of the "Proposal," and which are to be submitted at the time of receipt of bids, should be bound in the "Construction Documents" immediately after the "Proposal Form." These may consist of a "Bid Bond," "Oath or Collusion Affidavit," "List of Subcontractors," "List of Contractor's Qualifications," and any other documents that would be in the best interest of the owner to obtain at the time of bidding.

The "Contract Forms" is the term used to denote the various legal contractual documents. This will include the contract "Form of Agreement"; the "Surety Bonds," such as the "Performance Bond," the "Labor and Materials Bond," "Statutory Bonds," and "Maintenance Bond"; "Wage Rates"; and various other forms of a strictly legal or contractual nature, some being Governmental or public-agency regulations. Those "Contract Forms" which the architect wishes to use that are standard AIA forms, such as "Agreement Form," "Performance Bond," need not be physically bound in the "Construction Documents," but should be made a part of the contract by reference and listing in this portion of the "Construction Documents."

The "Specifications" will consist of Division No. 1, General Requirements (OCTOBER 1961 P/A) setting forth the General Conditions, Special Conditions, Temporary Facilities, Alternates, Cash Allowances, and so on, and the remaining 19 technical divisions encompassing groups of related trade sections (SEPTEMBER 1961 P/A).

We find that the proposed arrangement of the "Construction Documents" into the three main categories provides an orderly, consistent, and appropriate grouping. Furthermore, under each of the three main categories there are additional subdivisions, each with its appropriate heading and content which provides for systematic arrangement of all of the subject matter now found between the covers of a book of specifications. This arrangement is flexible enough to permit future additions and changes to be incorporated in the proper places.

The "Construction Documents" will therefore be arranged as follows, and can be so listed in the table of contents:

TABLE OF CONTENTS

BIDDING DOCUMENTS
Invitation to Bid
Instructions to Bidders
Proposal
Bid Security Bond

CONTRACT FORMS
Form of Agreement
Form of Performance Bond
Form of Labor and Materials Bond
Wage Rates
Other Legal Forms

SPECIFICATIONS
DIVISION NO. 1,
GENERAL REQUIREMENTS
Section 1A—Project General Requirements
Section 1B—General Conditions
(See OCTOBER 1961 P/A for remainder)
DIVISIONS NOS. 2 through 20
(See SEPTEMBER 1961 P/A)

The term "Construction Documents" should not be confused with the term "Contract Documents." The "Contract Documents" are concerned with those documents that are actually included in the contract and should be listed and defined to indicate the basis of agreement. These "Contract Documents" should be defined and listed in Section 1A, Project General Requirements of Division No. 1, General Requirements.

The "Contract Documents" normally consist of the Form of Agreement, Contract Drawings, and Construction Documents. These three documents will in most instances include all items pertinent to the contract after the "Form of Agreement" has been properly drawn, as well as addenda.

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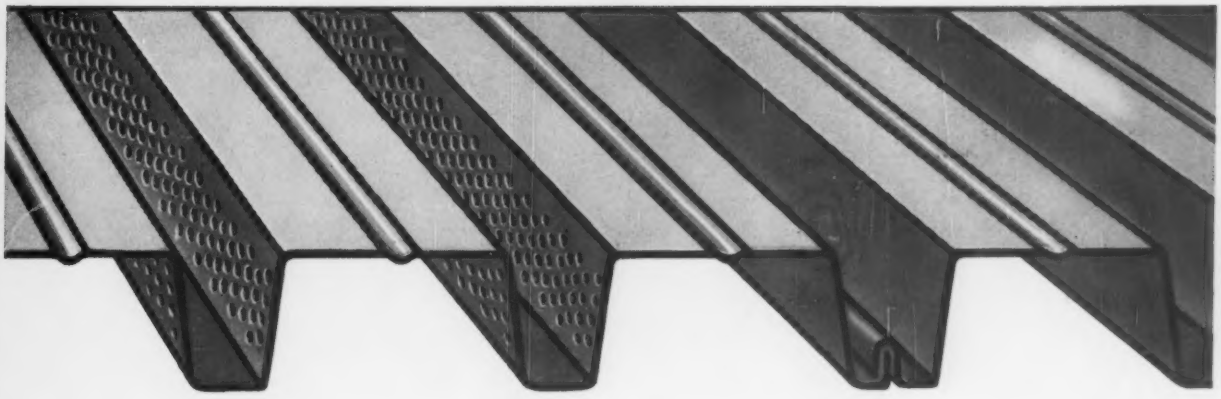

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. . . CERAMIC tile

Continued from page 185

design ("a discreet silence"); the Museum of Contemporary Art "was pushed aside by aggressive interference of interested parties"; the plan for Algiers "was truncated by friends"; the Antwerp plan "received no more than a brief casual glance from the jury"; the Buenos Aires plan "was decided by the whim of a skillful speaker, while the committee sat quietly, impassively and democratically by"; the proposal for the Paris International Exhibition of 1937 "did not even get a formal acknowledgement"; the project for the Vaillant Couturier "was rejected with a certain amount of hastiness"; on the La Rochelle plan he "has not been consulted since 1947, nor paid (13 years)"; on wartime planning proposals for the Pyrenees: "After 1946: Good-bye, Mr. Corbu!"; the Saint-Dié plan "one man torpedoed . . . one man succeeded in suppressing"; the plan for La Rochelle-Pallice "was sabotaged under the same conditions as the one for Saint-Dié"; *l'affaire* United Nations was "the most appalling shock that a man could suffer—a shock to fundamental human decency, to friendship itself; Le Corbusier stripped of all his rights, without conscience and without pity"; and in the case of the *Unité* in Berlin, "German architects changed the plans behind the scenes and had mass-produced components without L-C's knowledge . . . everything was messed up."

Americans do not fare well either. The book *When the Cathedrals Were White* was "very friendly to the American people" but "for years the American publishers' accounts have stated laconically: 'sales—nil'"; the Villa Savoye was "occupied by German and American troops (result: doors torn out and furniture removed!)"; the model of the Palace of the Soviets "went to The Museum of Modern Art . . . and toured the United States in a traveling exhibition . . . It never came back!"; when Le Corbusier was nominated as architect for the UNESCO building, "the U.S.A. interposed a veto"; and Saint-Dié was being destroyed by the retreating German army "in front of the Americans, who remained some distance away."

Even when his projects were successfully completed, according to his plans and under his supervision, he still finds it necessary to make disparaging, often infantile comments about these great architectural achievements.

Thus the Pavilion of l'Esprit Nouveau was "most effectively hidden"; Villa Savoye was classified a historical monument by the French Government "without L-C's knowledge"; to the opening of the Pavillion des Temps Nouveaux "nobody has turned up"; "the bankers smothered" L'Immeuble Charte; the only comment about the Lac Leman house reads: "Officialdom in the form of the Municipal Council of an adjoining community declared: 'This house is a crime against nature; it must never happen again'"; and the only comment about the Garden-city of Pessac: "Violent protests of the contractors and public opinion. Boycotted. The town remained waterless, and consequently uninhabited, for several years." The main point about his pavilion at the 1937 Paris International Exhibition seems to be that "no bigwigs came to open it." When he was given approval to proceed with construction of L'Unité d'Habitation at Marseille, "five years of storm, spite and uproar followed, despicable, ugly," and when admission was charged to visitors, he complains that the proceeds were pocketed "without disgorging a penny for the money-box of the studio draughtsmen." At the opening of the Swiss Pavilion, "the inauguration ceremony was like a funeral" and "silence followed" a speaker's comment that it was the finest modern building. There was also apparently not sufficient praise of the Swiss Pavilion's mural, because "silence enveloped it and envelops it still." The final comment about his own small beach-house is, "Note: Building a home like this is forbidden by the bye-laws." Even the weavers of his tapestries had to work "in face of obstruction from certain officials."

It should be emphasized that most of these comments appear in captions only a few lines in length and that, except for some introductory material, these captions are the only remarks Le Corbusier makes about his work.

Perhaps the most telling is a sentence that reads: "Some men have original ideas and are kicked on their behinds for their pains." No wonder that Le Corbusier is surprised at the general acceptance of Ronchamp: "Strange unanimity inspired world opinion, including even the Church of Rome."

So much about Le Corbusier the man. Le Corbusier the artist appears in the book as a far greater person. *Creation Is a Patient Search* is a beautifully designed and printed resumé of Le Cor-

Continued on page 196

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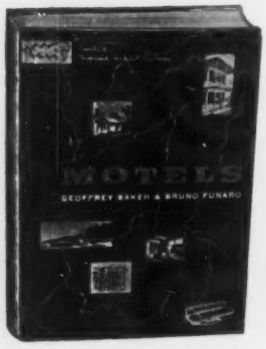

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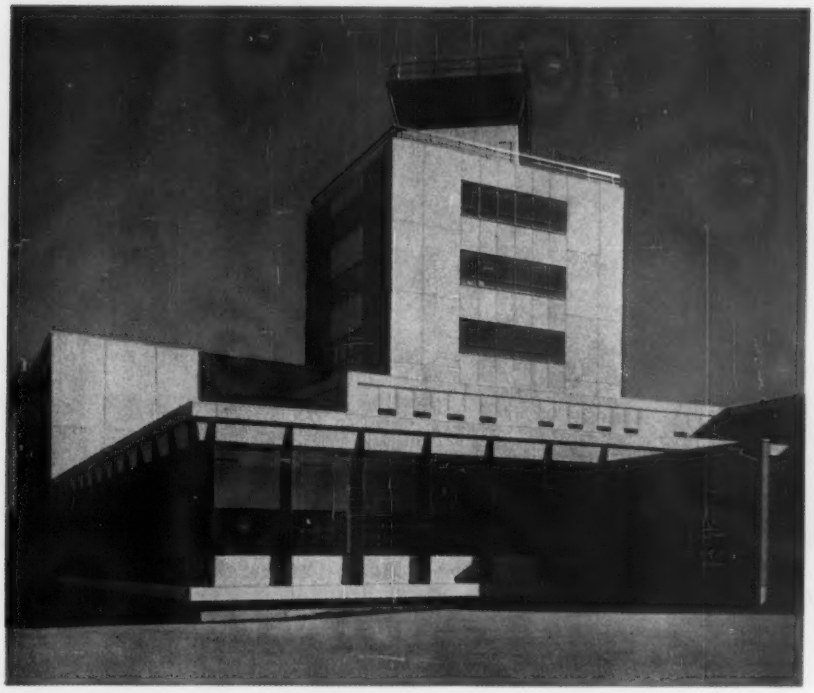

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Continued from page 193

busier's life achievement in the visual arts. One is led excitingly and relentlessly through the whole gamut—from earliest childhood pencil sketches to latest tapestry designs, from the first cubist "machines" to recent sensualist masterpieces of architectural composition. The choice, sizing, and placement of illustrations is excellent, and occasional use of strong color and graphic devices further dramatize the already powerful presentation. Visually, the book is just as exciting as Le Corbusier's other artistic endeavors which it illustrates.

Although *Creation Is a Patient Search* was printed in Germany, there are only a few typographical mistakes; perhaps there should have been more, because one of them ("Much of what L-C has created has been worked out in his . . . pubic statements") adds a badly needed human touch to Le Corbusier's analysis of himself.

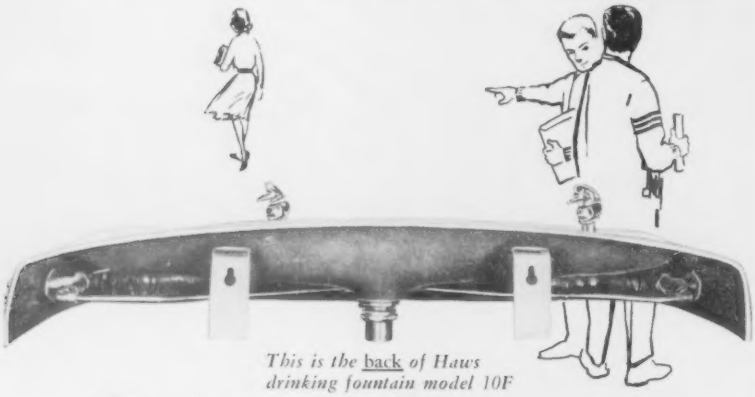
The second book, *Le Corbusier 1910-1960*, is much more factual. Referring to the old *Oeuvre Complète* series, Le Corbusier said: "I had determined the contents of the books: there was to be no flattery, no literary explosion, nothing but flawless documentation." In this book, Willy Boesiger (now a co-editor) continues with the master's precept. *Le Corbusier 1910–1960* is not as beautifully designed or as well printed, nor does it have the drama and the excitement of *Creation Is a Patient Search;* yet, in some ways, it is a clearer, though drier, record of Le Corbusier's work now spanning the period of fifty years. It encompasses in one volume all the material contained in the six well-known volumes published intermittently since 1929. The main difference between this compilation and the old *Oeuvre Complète* is in the nonchronological arrangement of the contents. The latest compendium has been divided by subject matter, and the progression in the development of a single building type can be seen more clearly. On the other hand, the changing design approach of Le Corbusier—from academic cubism to vigorous sensualism—is somewhat lost by the abandonment of a chronological sequence. The building types are grouped into four sections: houses; large buildings; museums, exhibitions and religious buildings; and a separate chapter on Chandigarh. The remaining sections are on painting, sculpture, and tapestries; and on town planning.

The third book, *Le Corbusier Talks with Students,* is a new edition of a nonillustrated little book first published in France in 1943. It contains a talk Le Corbusier gave in 1942 to the students at the École des Beaux-Arts in Paris. Le Corbusier has considerably more empathy toward the young than toward grown-ups, and the talk is a friendly ramble aimed at conveying Le Corbusier's ideas to the students and at inspiring them to oppose the nasty world of the old fogies.

In view of the recent Symposium on the State of Architecture in PROGRESSIVE ARCHITECTURE and the resulting discussion of the present tendency toward "chaoticism," it might be interesting to quote a few words from the first paragraph of Le Corbusier's twenty-year-old talk: "What is the state of architecture today? Never in the past has society been as directionless as ours. . . . This confusion is at its height . . . France . . . is at the center of this chaos."

Despite his favorite pastime of blowing vitriolic soap bubbles, in all three books Le Corbusier clearly stands out as a great artist and a great poet. So

Continued on page 202



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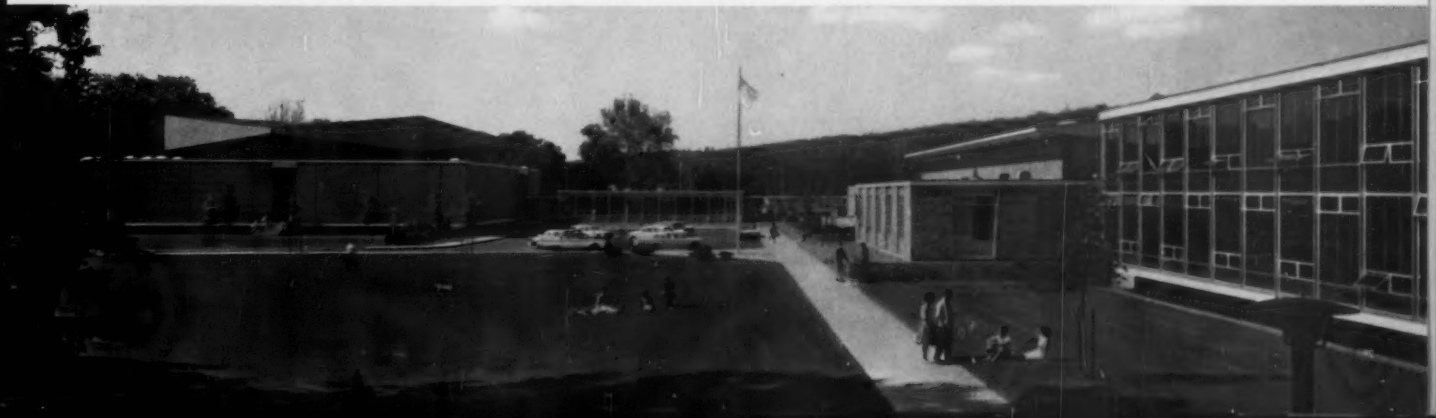
Built on a campus plan, this school is a complex of nine buildings, connected by open and closed corridors. It's a place of wide walks, open courts and expansive walls of glass—reflecting the philosophy Ithaca educators wanted built into it.

Entrance to the school campus. Auditorium at left, two-story classroom building at right, single-story Administration Building in center.



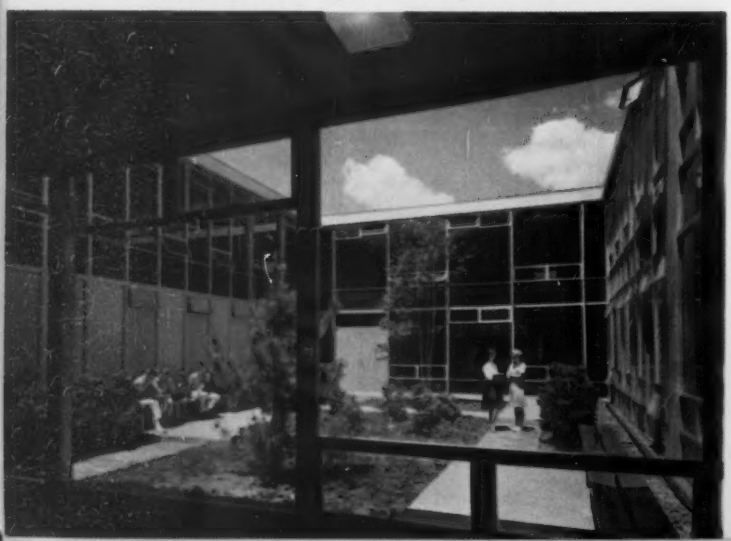
View from second-floor corridor shows long wall of *Parallel-O-Plate* Glass in connecting single-story wings.

Supervising Principal Frank R. Bliss explains it this way. "We want to give our students all the freedom we possibly can, both in their actions and in the atmosphere of their surroundings. Our students come and go—just so they meet their scheduled classes and activities. You won't see any corridor guards. And you won't see teachers herding students from one place to another.

Supervising Principal
FRANK R. BLISS
"Architecture complements the educational concept."

"We feel, too, that school architecture should complement and encourage this educational concept. And we believe ours does—in the openness of its campus arrangement, and in the design of the buildings themselves, with their expanses of glass which encompass the student without 'imprisoning' him from the world outside."

Students enjoy open patio in center of classroom building during nonscheduled periods. Natural light pours into inside corridors through glare-reducing *Parallel-O-Grey* Plate Glass.



Lawrence Bach, Head of the Science Department, is dedicated to putting that educational philosophy into action at the classroom level. He speaks for the entire school faculty when he says, "We couldn't be happier with our school. It's a pleasure to teach here."

And the kind of student freedom you allow here hasn't caused any attendance problems or classroom laxity?

"If anything, attendance is better than ever. Students *like* coming to school here. They are more receptive to learning, and more responsible in their work."

As a teacher, do you favor this extensive use of glass?

"I do, indeed. Especially as a science teacher. I teach the phenomena of life—and there life is, going on right outside these big windows. We see in action what we study in the classroom. The growth of plants. The flight of birds. The antics of squirrels. The real world becomes part of our classroom world."

With all this glass, what about glare?

"These windows are grey glass which subdues glare from outside. Yet there's plenty of natural daylight for all ordinary classroom work. The only time we use artificial light is for close work with microscopes."

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Does the increase in natural light interfere with visual aids?

"That's no problem. Venetian blinds or very light shades are all that's needed. In fact, some of the newer visual-aids equipment is strong enough so that no shades of any kind are required."

Head of Science Department
LAWRENCE BACH
"Life in action outside big windows."

But a school is created for the benefit of its students. And the proof of its success lies with those students. Ann Mosher, Vice President of the Student Council, speaks for the student body. "We love it. We feel it's a better place in which to learn. It makes us want to come here. Gives us a desire to do our best. Maybe it's a kind of challenge to us to be worthy of it.

Vice President of Student Council
ANN MOSHER
"A challenge to do our best."

"And we like the 'college-campus' feeling—and I think this campus environment will help those of us who go on to college to adjust more readily to that new life. I guess, to sum it all up—it makes us feel more grown up. We appreciate that, and try to live up to it."

Making a school function properly is not just a desire on the part of administration, faculty and students. There are the practical aspects of maintaining buildings and grounds, of providing all the physical facilities to keep the school operating efficiently.

Two walls of this interior conference room in the Student Activities wing are *Parallel-O-Plate* Glass to separate activities, yet maintain a light and open atmosphere.

Plant Manager Rollin Hood admits, "It's a big job. And it's going to get bigger. The key to the whole design of this school is 'flexibility'. So it can grow. Right now, it can handle 1600 students in grades 10, 11 and 12, and it's planned for future expansion up to 1000 more. Also, its facilities serve our entire community, evenings and weekends the year 'round.

"Maintenance of the nine buildings and campus is a big job. But we do it with seven men plus student help. In fact, my student crew cleans the entire school every day in just one hour. It's a system I'm kind of proud of. And we even save money with it —saved $22,000 in maintenance costs last year on just one building!"

Does this kind of building create heating difficulties?

"The campus arrangement of buildings puts a little heavier load on heating. More outside wall space open to the weather. But other advantages more than make up for that."

Laboratories, shops and workrooms are separated from twin classroom buildings by a broad, central court.

Plant Manager
ROLLIN HOOD
"Maintenance plan to be proud of."

How about keeping heat out in summer?

"Our twin two-story classroom buildings have *Parallel-O-Grey* Plate Glass all around. And that seems to help control heat. At least, we've had no complaints from anybody about overheating—except in a few rooms in the single-story buildings with regular glass. But we are already planning to replace some of this glass with *Parallel-O-Grey*."

Does a greater amount of glass help reduce lighting costs?

"Many of our teachers and students, coming from conventional buildings, still have the habit of flicking on classroom lights as they enter, even though they don't need them. Once we break that old-fashioned habit, I expect to see a cut in lighting costs."

COST DATA

Area—191,180 square feet	
Unit cost per square foot (includes mechanical equipment with capacity to accommodate planned future expansion)	$ 18.60
Building construction cost	$3,556,689
Fixed equipment	188,597
Site development (drives, walks, exterior lighting, landscaping)	211,445
Athletic field development	37,800
Land, movable equipment, fees, contingencies	505,469
Total	$4,500,000

Impressive to look at, a pleasure to teach in, exciting to learn in—Ithaca High School is a worthy accomplishment for its entire community. And perhaps the final word should come from someone of that community who is outside the immediate environment of the school.

As we drove away from the school, our taxi driver—Ithaca citizen and taxpayer—said, "I bet students really *want* to go to that school. Probably learn more, too. You know, you really don't mind paying for a school like that!"

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Toronto's new terminal calls for a central administration building surrounded by four aeroquays. These aeroquays will house all the passenger facilities and operations of the domestic and foreign airlines flying in and out of Toronto.

Shaped like a doughnut, each steel-framed aeroquay will be two buildings in one, 660 feet in diameter. A roadway system will lead vehicles, by underpasses under the aircraft apron, directly to these airline buildings.

The first aeroquay is scheduled for completion in 1962. Sites for three others are available, and these aeroquays will be built as needed.

All-welded steel framework

All connections in the shop were welded. For just the 6,000 tons of column sections with welded cover plates, York Steel Construction welded some 40,000 lineal feet of steel. All rigid connection plates were field welded to the column sections at the site.

Steelwork erected in dead of winter

To maintain weld quality in frigid weather, York Steel Construction pre-heated and post-heated the steel, using mobile banks of oxygen and propane. All welds were ultrasonically tested at the site; no failures were reported. Although the winter was severe, only 3½ weeks of erection time were lost to the bad weather.

15,000 tons in under 180 days

York Steel fabricated and erected some 15,000 tons of shapes and plates for aeroquay No. 1. All steel went up in under 180 days. Bethlehem supplied 9,803 tons of wide flange, and 196 tons of plates. The balance of the tonnage was obtained from Canadian sources.

Steel framework of aeroquay No. 1. *Steel Fabricator and Erector:* York Steel Construction, Ltd.

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BETHLEHEM STEEL

BETHLEHEM STEEL

Continued from page 196

perhaps Camus was right when he said: "Every genius is at once extraordinary and banal. He is nothing if he is only one or the other."

Controversial Conference

New Schools for New Education. *Department of Architecture, University of Michigan. Educational Facilities Laboratories, 477 Madison Ave., New York 22, N.Y., 1961. 56 pp., illus. (paperbound)*

New Schools for New Education is the latest report from Educational Facilities Laboratories, the Ford Foundation affiliate which rapidly is establishing itself as a force for the betterment of school facilities throughout the country. Here are set forth the findings of a conference of architects and educators, sponsored by EFL, which was held at the University of Michigan October 19–21, 1959, to explore "the architectural implications of *Images of the Future*," the by now familiar report of the Commission on the Experimental Study of the Utilization of the Staff in the Secondary School, better known by the name of its director, Dr. J. Lloyd Trump.

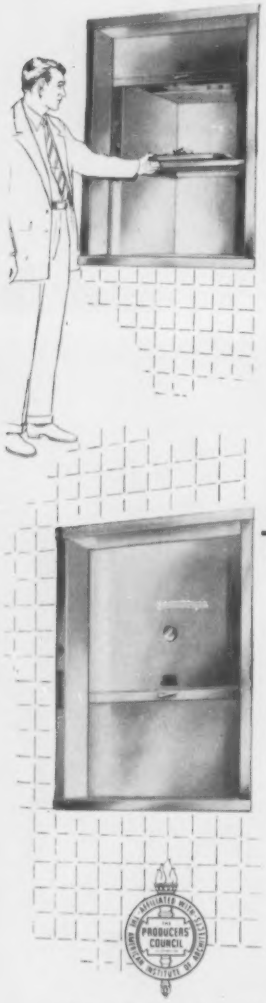
The "Michigan Conference" report suffers somewhat from late publication (subsequent conferences and further work by Dr. Trump and his committee have dated it; and some of the problems posed, such as adequate soundproofing of movable partitions, already have been solved through the efforts of EFL in collaboration with certain manufacturers), and the conference was limited from the first to the Trump Committee's vision of the future high school. Furthermore, the typography and general format, which apparently were determined by the Department of Architecture at Michigan, are not up to the usual EFL standards. The plans in many cases are so small as to be essentially illegible.

Ten architects, representing a good cross-section of the more dynamic and progressive school designers in the country, were commissioned to do original designs of schools based on the Trump Report; but there appears to have been a considerable variance in their efforts. By my count, only three produced entire schools of original design; two more, original details. One offered a school already under construction, although based on the Trump plan, and another showed how the Trump ideas could be incorporated into a school already built. The contribution of the remaining three is unclear (as is the part played by the majority of the 52 persons listed as participants, a relative handful of whom are mentioned in the text).

It is interesting to speculate on how much the selection of participants in such a conference determines the conclusions which will be reached, and how much the alchemy of "group dynamics" (I believe that is the currently fashionable phrase) may inject unsuspected elements. Don Barthelme of Houston is a master alchemist who obviously enjoys contention, and Dean Colbert of Columbia University is no slouch in this respect. Barthelme, if this report represents a full picture of what occurred, and if eyewitnesses are to be believed, supplied much of the stimulation at Ann Arbor with some cogent observations on teaching methods in general and his own solution, which he terms the Situations Method; whereas his disputatious criticisms of "flexibility" seem to have been less constructive. Flexibility is a subject which deserves more consideration than it usually gets, but the effort here appears to have been toward controversy rather than solution.

Continued on page 206

Concentrate Responsibility...



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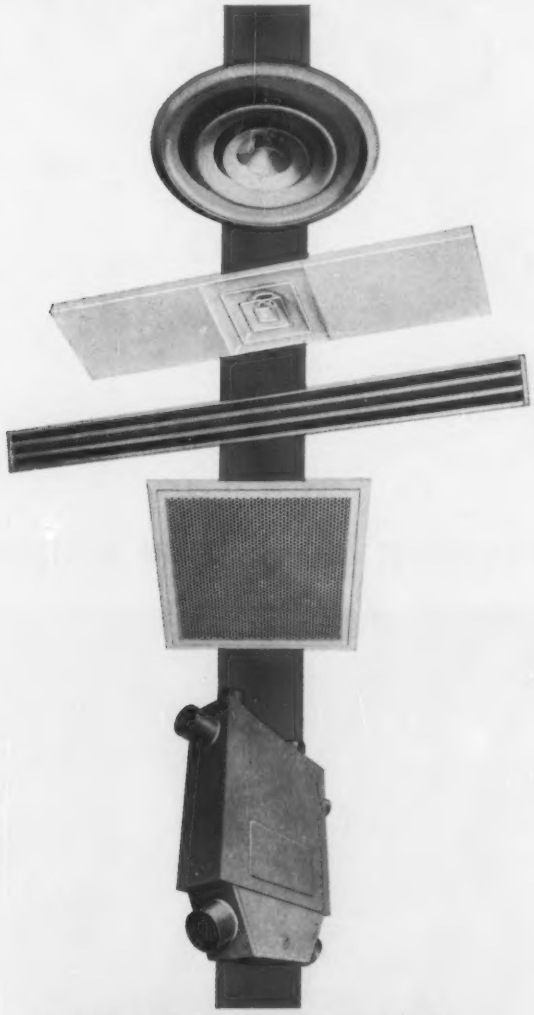

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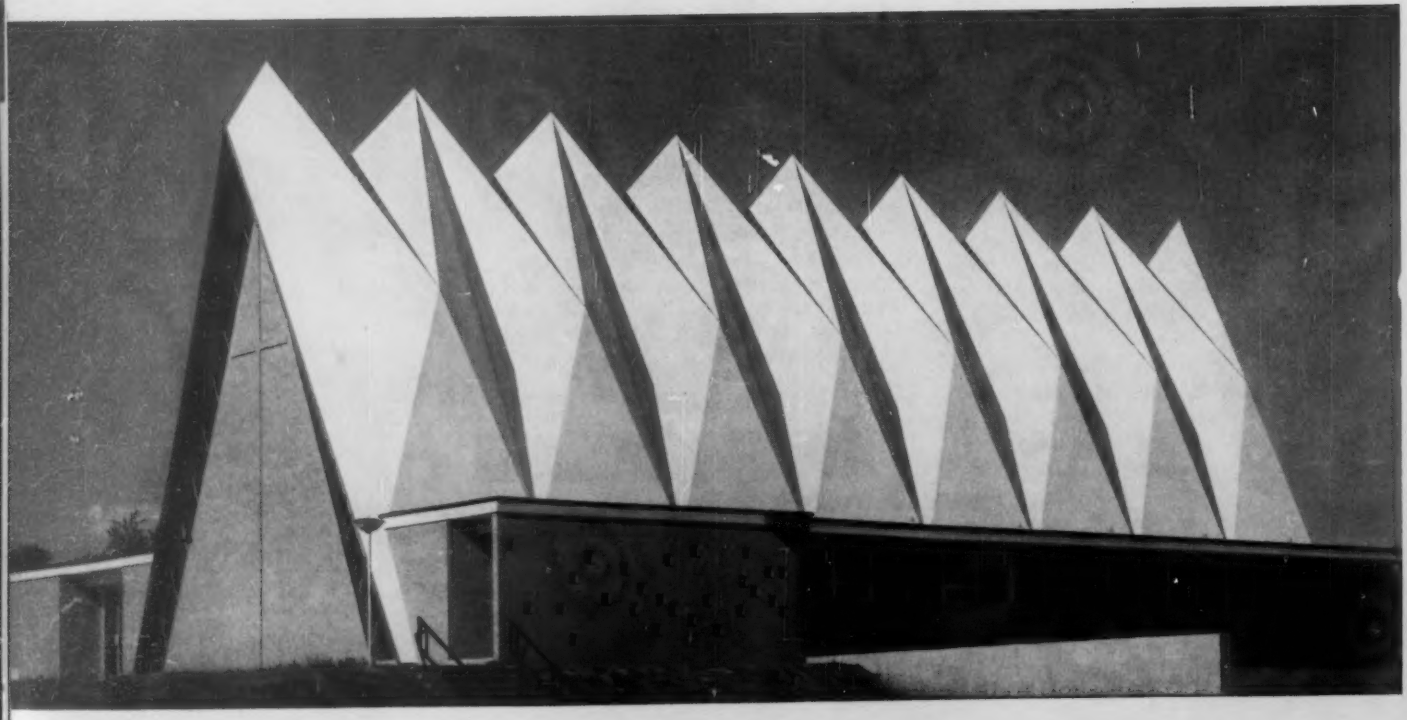
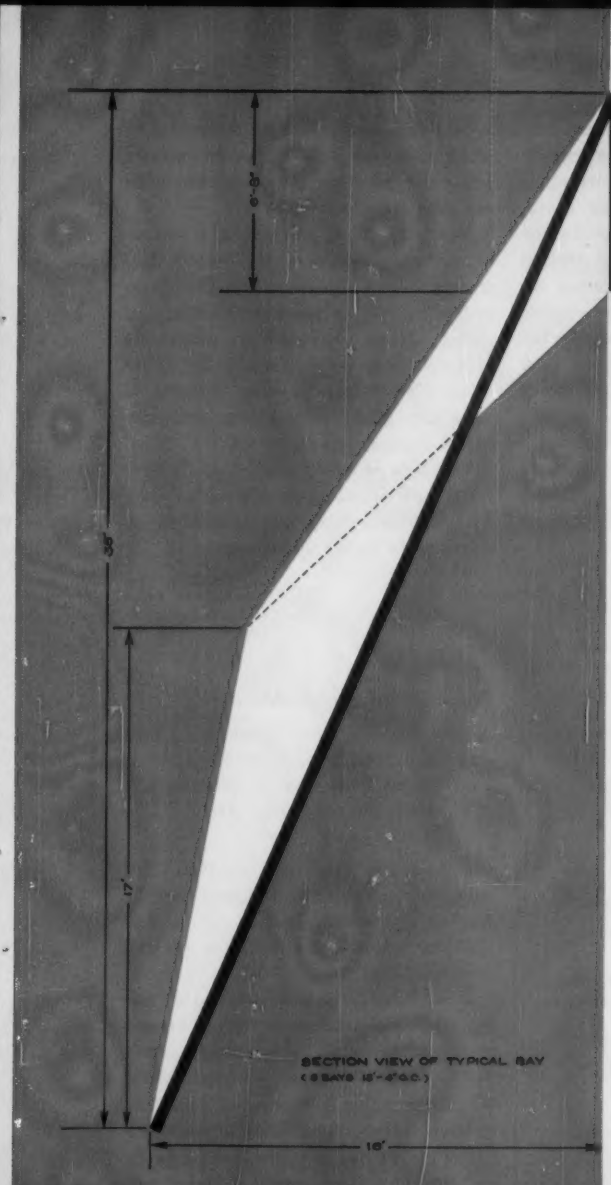
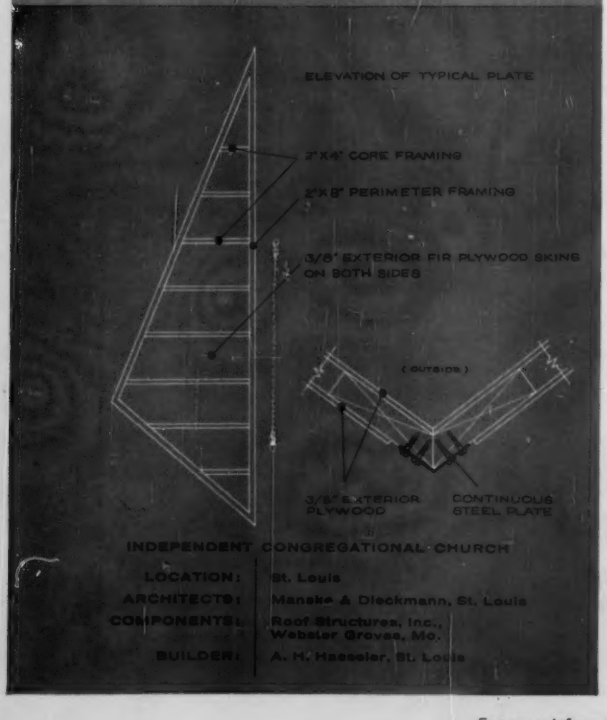
the most exciting ideas take shape in fir plywood







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Continued from page 202

It is difficult to see what was resolved at the University of Michigan beyond a slight drift toward a better understanding of secondary-school facilities by some key people, but perhaps this is all one can reasonably expect. That "it was clear to everyone that *enormous changes are under way in the basic nature of the American educational system*" scarcely seems an earth-shaking discovery. "How to accommodate them" still appears to have remained "the pressing question" as the conference ended.

Yet several interesting solutions *were* proposed, notably those of Colbert, Barthelme, and Reid. But my experience leads me to believe that it is wrong to impute to architecture, or even educational systems, the ability to evoke "inspirations on the part of both teacher and student" which will "electrify the air." The only sure way to accomplish this is to employ inspired teachers and give them the freedom to inspire their students. Physical environment should help rather than hinder this process, and various systems of breaking down classes or combining them or rearranging the curriculum will be useful aids to achieving the individualization of instruction to which everyone today pays lip service but which so few school systems make any real attempt to achieve.

Most important, perhaps, is a realization that the requirements of individual students are so diverse that the Q-Space, or the carrel, or machine learning, or varied group size—while potentially valuable—are not solutions in themselves. What may promote learning in some may inhibit it in others: there can be no panaceas in education.

The title of this report, *New Schools for New Education*, promises more than it is able to deliver, but there is stimulation to be found in its pages.

PHILIP H. HISS
Designer and Author
Former Chairman, Board of Public Instruction, Sarasota County, Fla.

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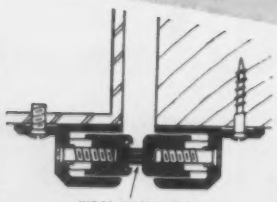

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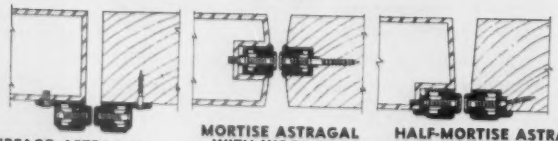

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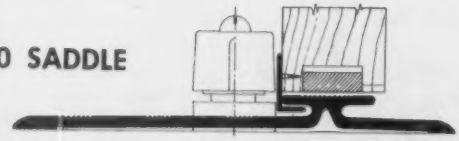

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More Than an Architect

Antoni Gaudí. *James Johnson Sweeney and Josep Lluis Sert. Frederick A. Praeger, Inc., 64 University Pl., New York 3, N.Y., 1961. 191 pp., illus. $15*

Conceived as long ago as 1946, this work was intended as the first book in English on Gaudí. Instead, it seconds last year's Braziller publication by Professor Collins.

In addition to this misfortune in timing, the book suffers from an avowed multiplicity of aims. This may stem from the problems of dual authorship, for it is obvious that Sweeney and Sert, rather than collaborating word by word, divided the writing between them. The result is a defeat of a second major aim, that of presenting Gaudí the whole man, in the tradition of Renaissance architects. Gaudí was more than an architect; he was an inventor of form, a remarkable draftsman, a colorist, and a sculptor. But to dissect him into chapters reflecting these different facets in their headings, and to have these chapters in completely divergent writing styles, conflicts with Gaudí's very nature.

That dual authorship can have valuable results, in part, is proved by two chapters obviously by Sert. First architect to write about Gaudí, Sert is succinct and clear concerning Gaudí's unique architectural and structural procedures, in the chapter entitled "The Architect-Builder." And Barcelona-bred, as was Gaudí, he presents in the second chapter the best available description in English of the complicated Catalan background — religious, political, archi-

Continued on page 208

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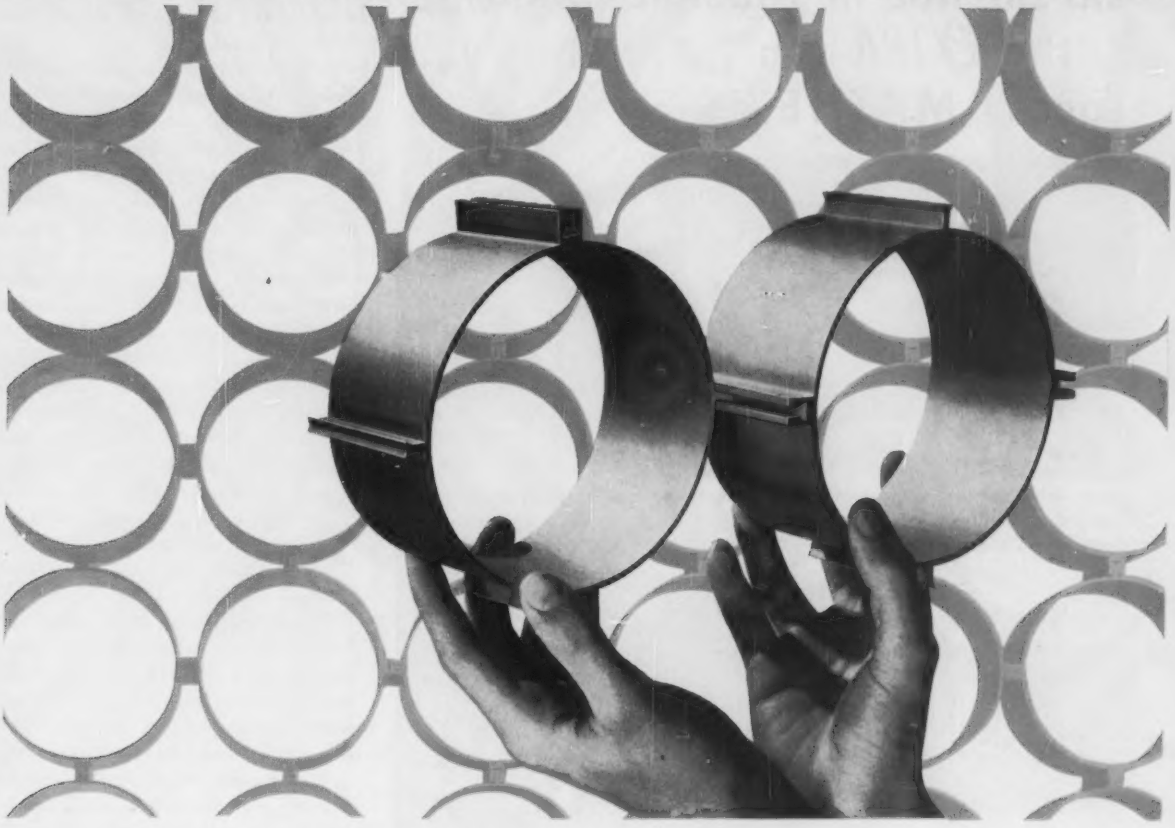

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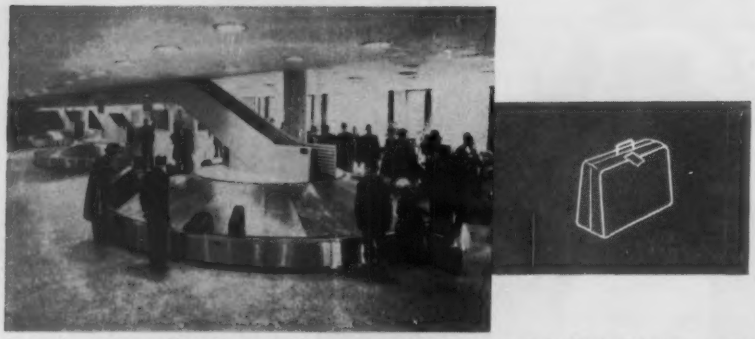

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Continued from page 206

tectural—and of the local events which influenced Gaudí.

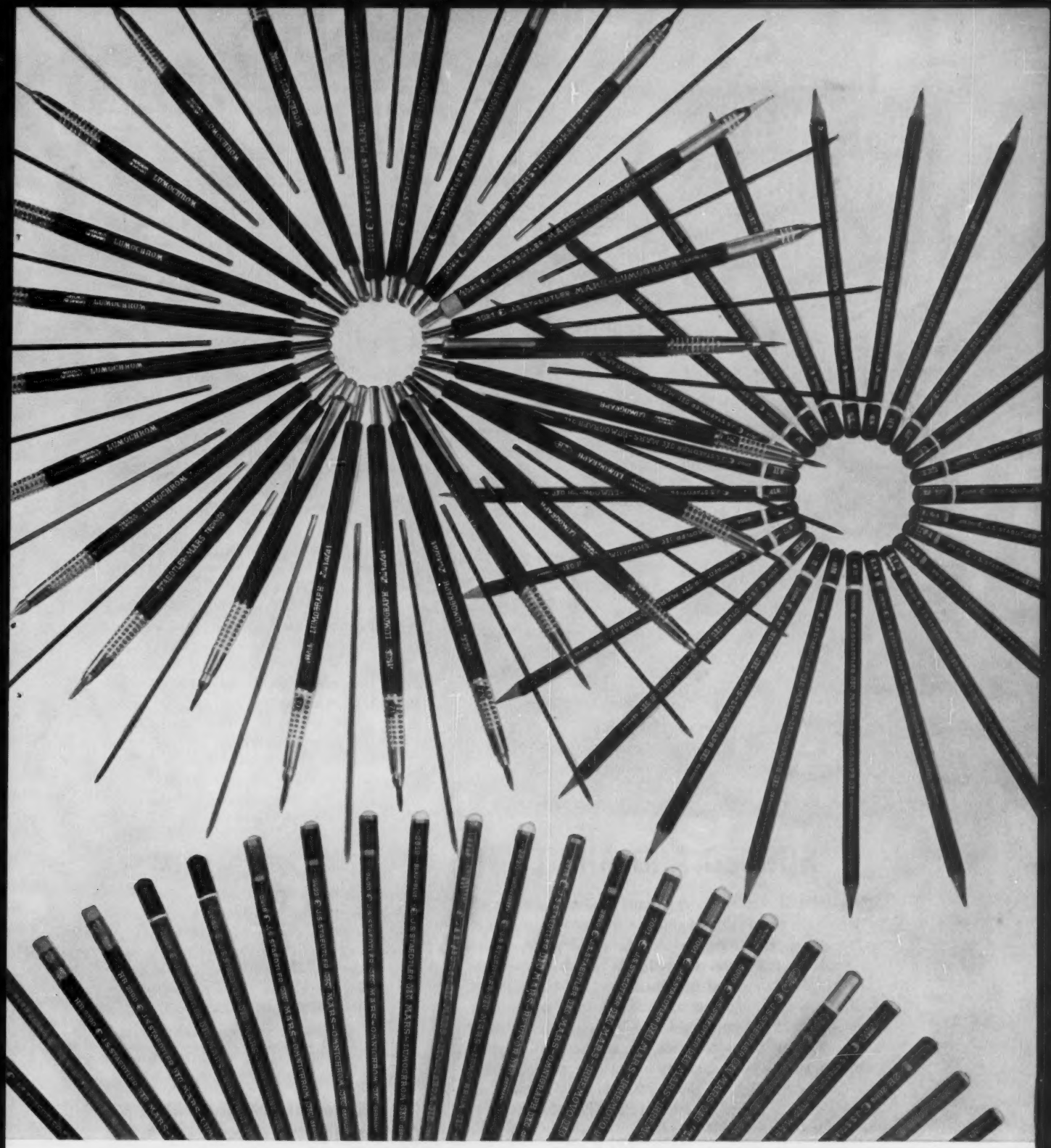
If Sert's style can be identified with these chapters, then Sweeney's can with the one on texture and color, and with one called "Gaudí—Sculptor." He devotes part of this latter chapter to an explanation of the difference between sculpture and architecture, ignoring, unaccountably, the role of space, although Gaudí was very grandly a space-maker, both urban and interior. Sweeney says: "For paradoxically enough, what gives sculpture its monumentality dwarfs one's architectural conception. Architecture can achieve an effect of monumentality only by scrupulously observing its basic human measure, or module — by constantly returning to it for reference. Sculpture, on the contrary, achieves its expression of monumentality through a suggestion of the immeasurable—by avoiding any exhaustively factual or obviously measurable representation of natural forms. Architecture fails aesthetically to move us whenever it disregards the human module. It should be built essentially around and for man. Sculpture, on the contrary, when closely tied to the human being through naturalistic representation, is at once dwarfed. and for the very reason that it is seen as measurable."

I have quoted at some length because the sound of Sweeney's words seems convincing, yet his argument is not. He uses his argument, apparently, to condemn the naturalistic sculpture on the Sagrada Familia church, and to theorize that no naturalistic sculpture can be monumental. He keeps his praise for Gaudí's abstract sculptural forms. But I think Gaudí's failure at the Sagrada Familia was in using direct casts of human forms, instead of transmuting them into aesthetically monumental works, commensurate with his architecture, but still naturalistic. Sweeney's digressions and theorizing muddy rather clarify.

A third major aim stated by the authors is to disclose to the public " . . . the discovery by the authors of the remarkable photographic files of Gaudí's work assembled by Joan Prats and Joaquim Gomis . . ." Enhanced by superb German plate-making and printing, the color photographs are excellent, especially the details of stained glass and flower forms, of sculptural chimneys, and of floating drifts of color in mosaic benches and walls. Better than words, these photographs emphasize Gaudí's

Continued on page 210

For more information, circle No. 391 ➤



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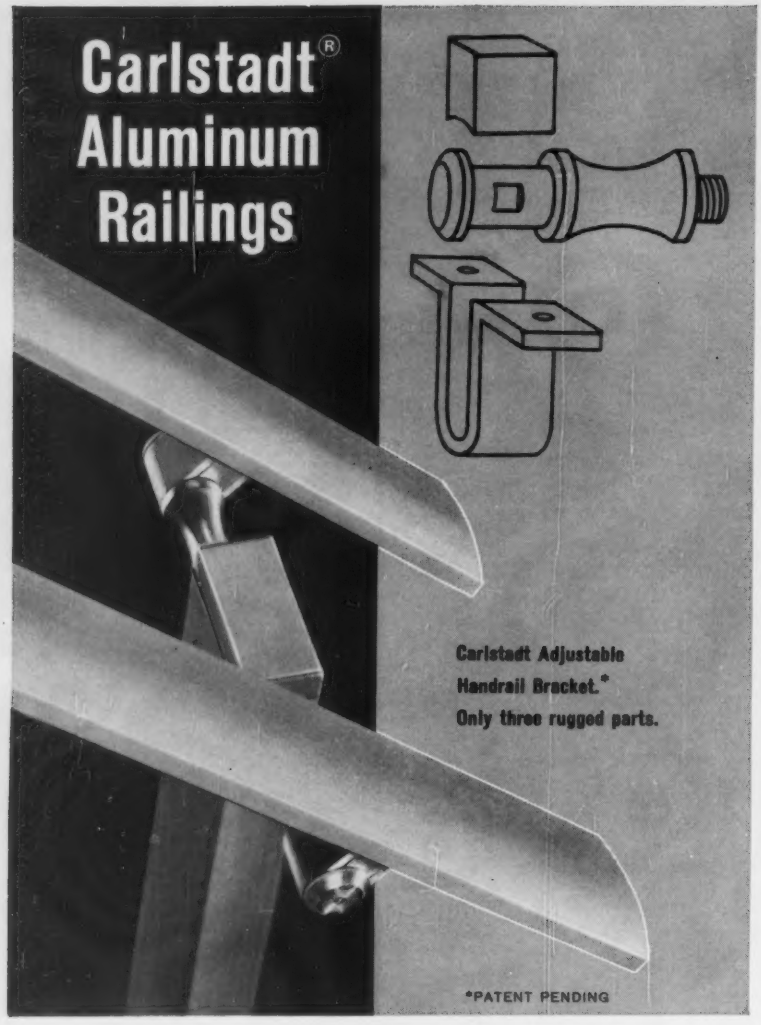

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Continued from page 208

unique incorporation of three-dimensional natural forms into architecture—"intrinsic nature, not its surface embodiments"—which distinguishes his work from the applied decoration of Art Nouveau.

The black-and-white details, however, are not comparable to the color photographs. Architectural interior views are lacking; there are too few details of the immensely important façade of the Sagrada Familia church, constantly referred to in the text; and for none of the structures is there a complete and consecutive series enabling the viewer to simulate the experience of walking through a Gaudí building. Many readers will be attracted to this book because of the color plates (to say nothing of the lavish format, fine paper and printing), but it is unfortunate that the architecture itself is not better served by comprehensive illustrations.

Additional illustrations ostensibly offer historical parallels to Gaudí work: Hokusai, Hogarth, Thomas Jefferson's serpentine wall, the Three Fates of the Parthenon, Brancusi. But these supposed parallels are only a parlor game if it cannot be proved that Gaudí was influenced by them, and the authors do not.

One final stated aim of the book has also been thwarted by the passage of time. In 1946, the authors hoped that a book on Gaudí might turn the attention of architects toward a more serious consideration of sculptural expression in architecture. Today, the point having been won without their book, the authors turn a discussion of Gaudí into an occasion for pointing out ". . . a dangerous trend toward limiting architecture to an aesthetic experiment detached from life . . . and toward making technology an end instead of a means." Not soon enough are these points made in direct relation to Gaudí's work.

PHYLLIS DEARBORN MASSAR
Dearborn-Massar, Architectural Photographers
New York, N.Y.

Not for the Average Architect

Structural Mechanics. *Samuel T. Carpenter. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y., 1960. 538 pp. $9.50*

Structural Mechanics is a competently written engineering text demanding a good basic understanding of engineering principles and mathematics through

Continued on page 214

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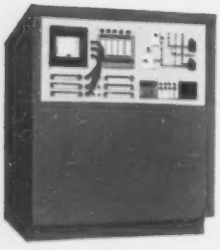

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Continued from page 210

partial differentials, and is thus not for the average architect.

It thoroughly covers the usual theory and mathematics of indeterminate structures, as well as introducing cables, curved beams, beam columns and axially loaded members, and presenting an introduction to structural dynamics. The book also uses uncommon mathematical methods such as finite difference approximations and Fourier series.

Architects will find the early chapters on indeterminacy and deflection theory very clear and illuminating, and will undoubtedly find many chapters of great interest. However, the book's main value is the description of a large variety of sophisticated shortcuts to the solution of problems in indeterminacy.

GORDON F. TULLY
New York, N. Y.

OTHER BOOKS TO BE NOTED

Political Influence. Edward C. Banfield. The Free Press of Glencoe, Inc., Division of Crowell-Collier Publishing Co., 60 Fifth Ave., New York 11, N.Y., 1961. 354 pp. $6

A fascinating study of decision-making in a variety of metropolitan issues. The place is Chicago; among the issues are the location of a large university, a plan to save the central business district by building high-rise apartments, and the building of a city exhibition hall. Author is a professor in the Department of Government at Harvard.

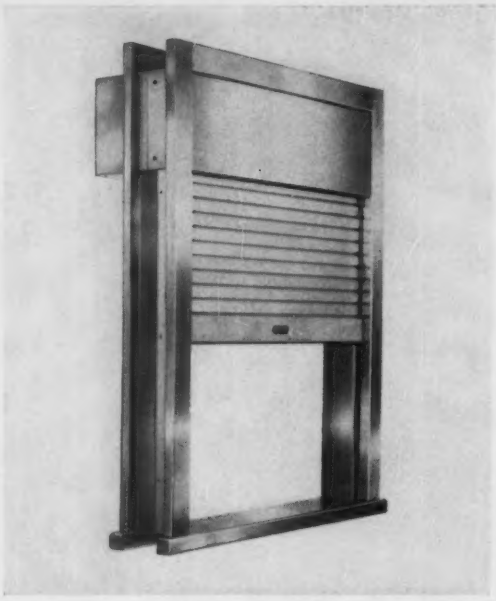
Schools in the U.S.A. Building Bulletin 18, Ministry of Education, London, 1961. Distributed by British Information Services, 45 Rockefeller Plaza, New York 20, N.Y. 360 pp., illus. $2.81 (paperbound)

A survey of American educational building, undertaken by two architects from the Development Group of the Ministry's Architects and Building Branch (presumably David L. Medd and Mary Crowley). The authors traveled for 12 months in this country, visiting over 200 schools and colleges, and conferring with numerous architects, administrators, educators, teachers, and students. Their book concentrates on presenting the great variety of educational requirements and architectural solutions; their text, therefore, is a condensed discussion and their drawings are diagrammatic.

Handbook of Instrumentation and Controls: A Practical Manual for the Mechanical Services Covering Steam Plants, Power Plants, Heating Systems, Air-Conditioning Systems, Ventilation Systems, Diesel Plants, Refrigeration, and Water Treatment. Howard P. Kallen, McGraw-Hill Book Co., Inc., 330 W. 42 St., New York 36, N.Y., 1961. 692 pp., illus. $15

Basic facts on instruments and thorough descriptions of complete control systems, for those who select, specify, design, and apply this equipment.

Continued on page 216



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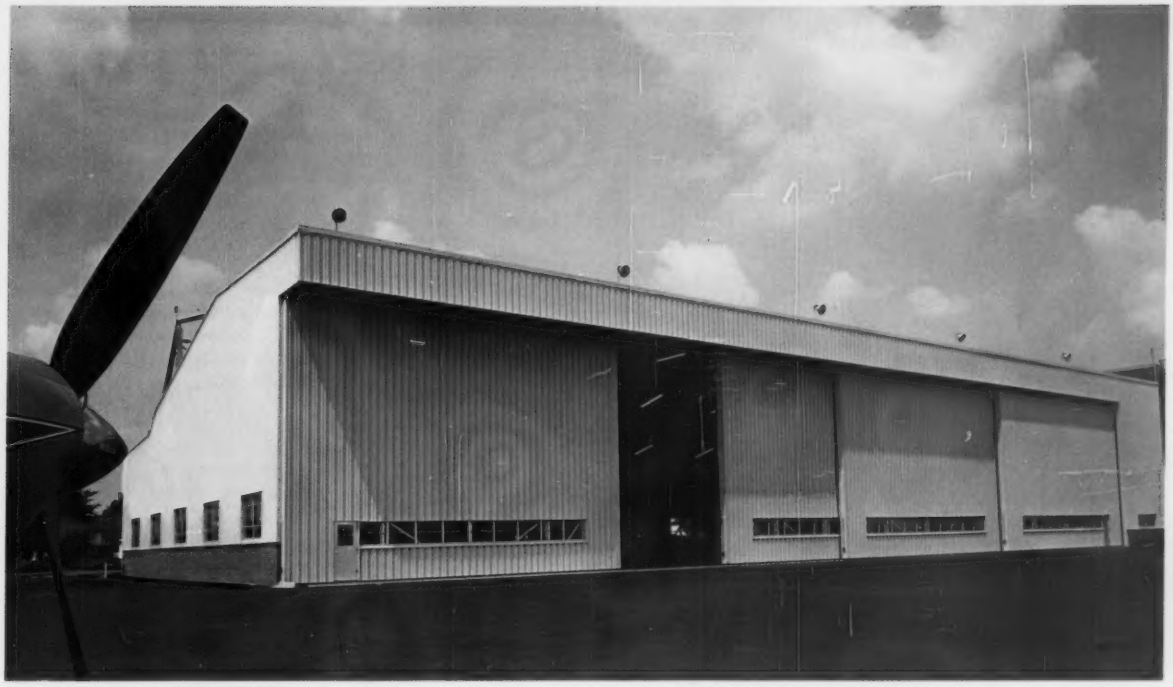

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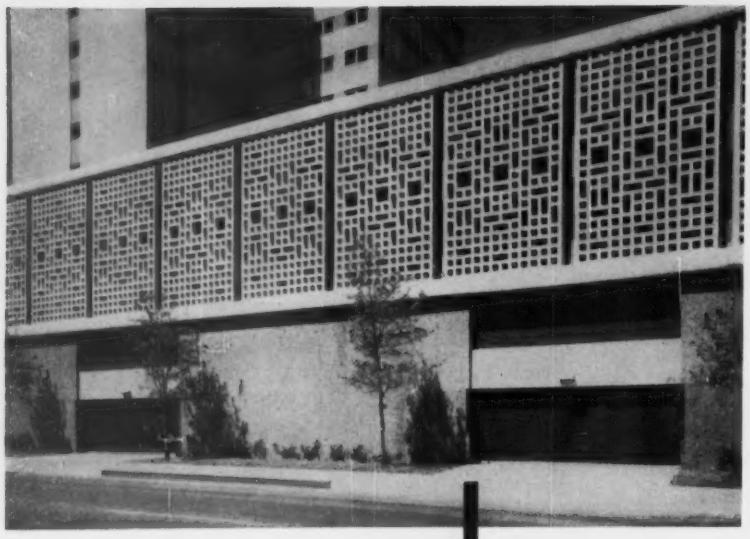

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Structural Engineering for Professional Engineers' Examinations. Max Kurtz. McGraw-Hill Book Co., 330 W. 42 St., New York 36, N.Y., 1961. 341 pp., illus. $9

Concise review of basic theory and its application to numerous problems, designed to prepare students for state examinations in structural and civil engineering.

Pile Foundations (Second Edition). Robert D. Chellis. McGraw-Hill Book Co., 330 W. 42 St., New York 36, N.Y., 1961. 683 pp., illus. $16

Comprehensive, up-to-date information on the theory, design, installation, maintenance, and repair of pile foundations.

List of ASTM Publications. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa., 1961. 62 pp. (paperbound)

Description of more than 300 current publications — symposiums, manuals, standards, reports — issued by the ASTM through the years.

Victorian Comfort: A Social History of Design from 1830-1900. John Gloag. The Macmillan Co., 60 Fifth Ave., New York 11, N.Y., 1961. 252 pp., illus. $10

Prestressed Concrete: Design and Construction. James R. Libby. The Ronald Press Co., 15 E. 26 St., New York 10, N.Y., 1961. 468 pp., illus. $12.50

Framing Systems for Schools. Leap Associates, Inc., Cochrane Bldg., P.O. Box 1053 Lakeland, Fla., 1961. 32 pp.

Booklet of construction and connection details for the various prestressed-concrete structural members. Details, in working-drawing form, show how double tees, keystone joists and giant tees are used in a variety of roof-framing systems. Leap Associates are consultants (engineering, merchandising, and management) to the prestressed-concrete industry. No text.

John Ekin Dinwiddie 1902–1959. Student publication. School of Architecture, Tulane University, New Orleans, La., 1961. 28 pp., illus. Subscription rates: $10 patron, $4 regular

A student memorial to the late Dean of the Tulane School of Architecture. It is a tribute to his personal and professional qualities, and a review (with plans and photos) of his work in the Bay Area and in New Orleans. Excerpts are included from his unpublished book-length article, The House—The Total Problem, The Trouble with Houses, and The Case for Mass Production.

Carboni: Twenty-five Publicity Campaigns. Introduction by Gillo Dorfles. New York Graphic Society, Greenwich, Conn., 1961. 178 pp., illus. $13.50

A collection of industrial posters and advertising work by the noted Italian designer. More than 700 photos.

Structural Foams. Building Research Institute, National Academy of Sciences—National Research Council, 2101 Constitution Ave., Washington 25, D.C., 1961. 84 pp., illus. $5 (paperbound)

Proceedings of the 1960 Fall Conference. The five papers are on foamed glass, foam and gas concretes, foamed metals, urethane foams in structures, and foamed polystyrene in thin-shell construction.

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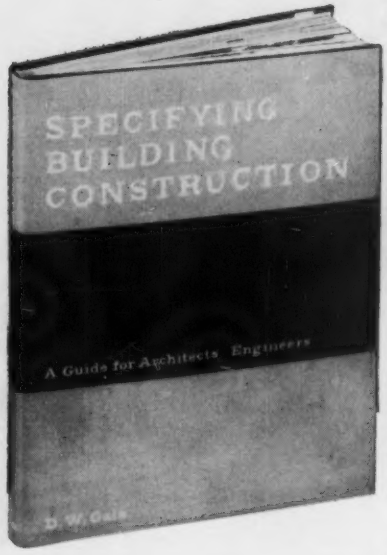

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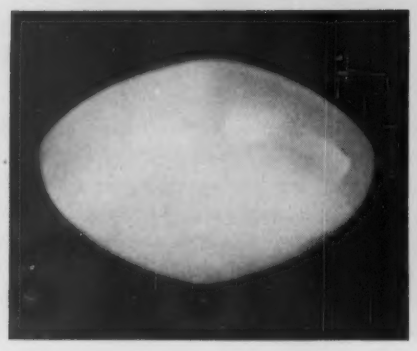

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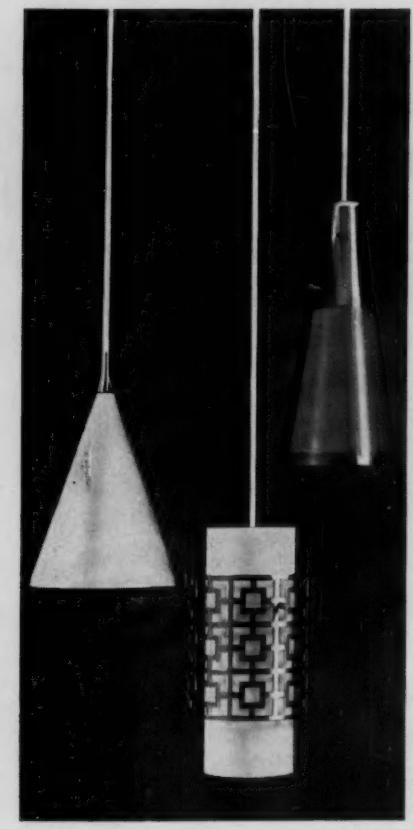

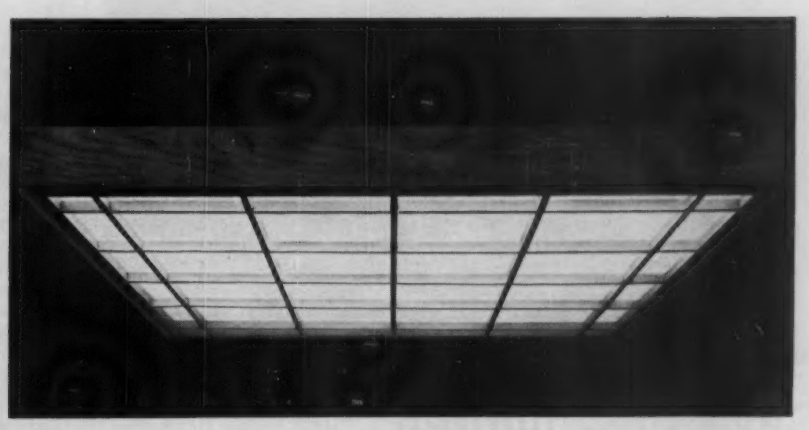

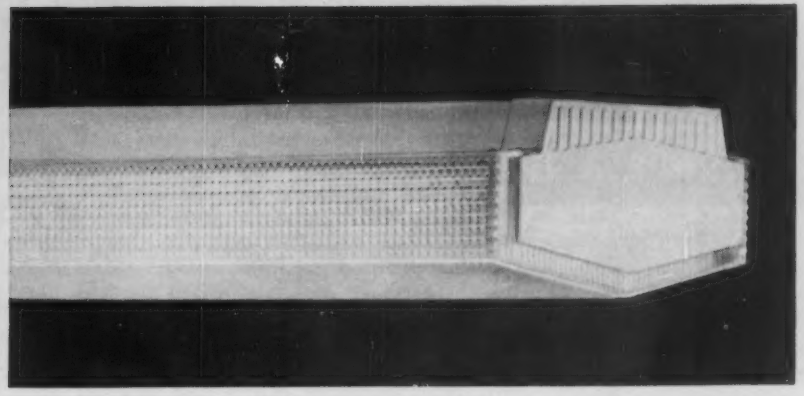

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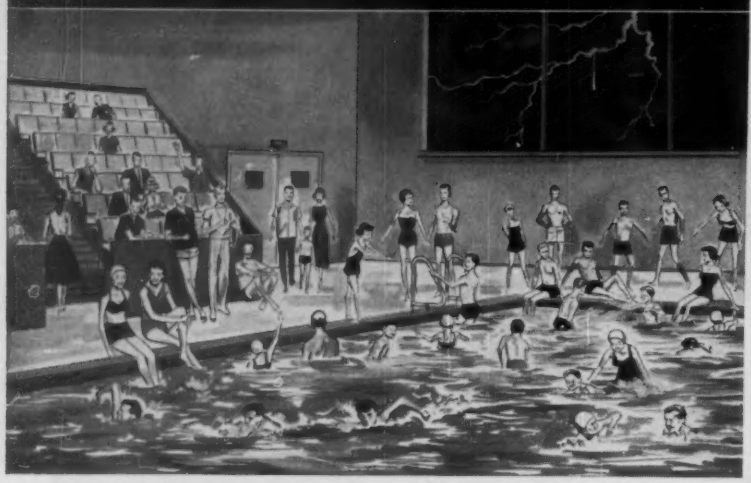
Where power blackouts must not happen



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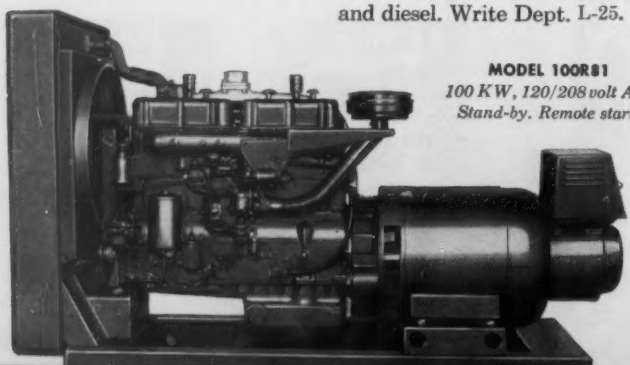

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Continued from page 216

Ideas for Building Barbecues. A Sunset Book. Lane Book Co., Menlo Park, Calif., 1961. 72 pp., illus. $1.50 (paperbound)

"For those who take their barbecuing seriously," a collection of plans and construction notes on a variety of permanent installations—simple grills, open-air kitchens, deep-pit barbecues, fire-pits, and smoke ovens. Illustrated with 175 sketches and photos.

Design for You. Ethel Jane Beitler and Bill Lockhart. John Wiley & Sons, Inc., 440 Park Ave. South, New York 16, N.Y., 1961. 206 pp., illus. $7.95

Textbook for elementary college course in basic design: balance, rhythm, line, color, etc. Authors are associate professor and head, respectively, of the Department of Applied Arts at Texas Technological College.

Statically Indeterminate Structural Analysis. R. L. Sanks. The Ronald Press Co., 15 E. 26 St., New York 10, N.Y., 1961. 602 pp., illus. $10

Textbook providing a thorough treatment of three methods of indeterminate analysis commonly used by structural engineers: virtual work, moment area, and moment distribution. Other methods are presented in less detail, but with adequate explanation to acquaint the reader with their potential value.

Taking-off and Pricing Estimates for Building Construction. Norman Foster. F. W. Dodge Corp., 119 W. 40 St., New York 18, N.Y., 1961. 256 pp., illus. $11.75

Step-by-step procedures for simplifying the preparation of estimates and at the same time achieving greater accuracy. A complete estimate for a $1-million building shows application of the author's recommendations.

Van Gogh: A Self-Portrait. Selected by W. H. Auden. New York Graphic Society, Greenwich, Conn., 1961. 400 pp., illus. $10

From the recently published The Complete Letters of Vincent Van Gogh, *a collection of letters that concentrates on his life as a painter: reflections on the art of painting and the problems of being a painter.*

General Excavation Methods. A. Brinton Carson. F. W. Dodge Corp., 119 W. 40 St., New York 18, N.Y., 1961. 400 pp., illus. $12.85

A practical guide to efficient excavation and earth-moving procedures. Author discusses preliminary investigations of the soil, various types of excavation and the equipment suitable for each, control of ground water, and transportation of excavated materials.

Public Construction Contracts and the Law. Henry A. Cohen. F. W. Dodge Corp., 119 W. 40 St., New York 18, N.Y., 1961. 416 pp. $12.85

First comprehensive guide to the procedures and fundamental legalities governing public improvement projects: Federal, state, and local. Author is Director of the Bureau of Contracts for the New York State Department of Public Works.

Surface Structures in Building. Fred Angerer. Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y., 1961. 142 pp., illus. $4.50 (paperbound)

Color in Architecture: A Guide to Exterior Design. Konrad Gatz and Wilhelm O. Wallenfang. Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y., 1961. 192 pp., illus. $16.95

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The elbow-grease is gone at these twelve handsome gymnasiums because they recognized the inherent advantages in Wayne Power Operated Gymstands. Here is the only Gymnasium Seating System in the industry offering this combination of features plus a choice of two basic types. (1) *Power Operation* in exclusive *Continuous* seat and footboard design with no breaks between sections. (2) *Power Operation* in "*Unit Connected*" seat and footboard design where gaps between sections are reduced to ¼"!

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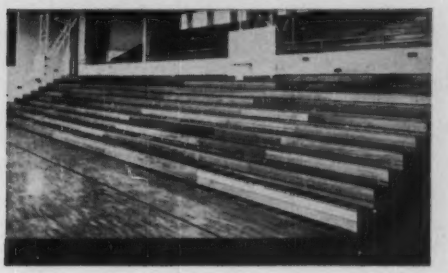
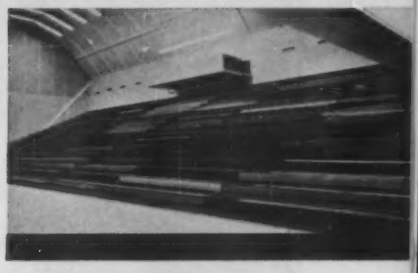
Gordon Technical High School—Chicago, Illinois
Architects: Fox and Fox—Chicago, Illinois

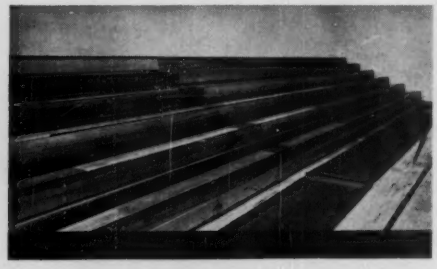


Inglewood High School—Inglewood, California
Architects: H. L. Gogerty—Los Angeles, California

Cerritos College—Norwalk, California
Architects: Kistner, Wright & Wright—Los Angeles, Calif.



Institut des Technologie—Trois-Rivieres, Canada
Architects: Denoncourt & Denoncourt—Trois-Rivieres, P/Q.



North Bend Junior-Senior High School—North Bend, Ore.
Architects: Hamlin & Martin—Eugene, Oregon

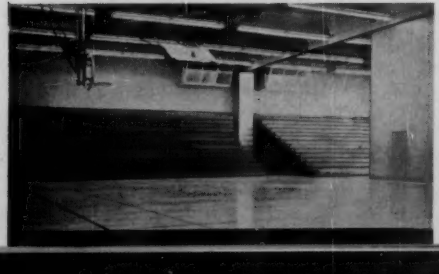
Millard Junior-Senior High School—Millard, Nebraska
Architects: Hollis and Miller—Overland Park, Kansas

Darien High School—Darien, Connecticut
Architects: Ketchum & Sharp—New York, New York

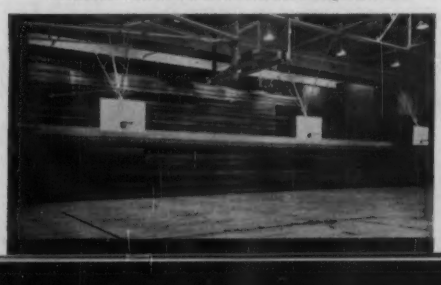
Lake Forest High School—Lake Forest, Illinois
Architects: Stanley D. Anderson Associates, Inc.—Lake Forest, Illinois

Hamilton J. Robichaud High School—Inkster, Michigan
Architects: Bennett & Straight, Inc.—Dearborn, Mich.

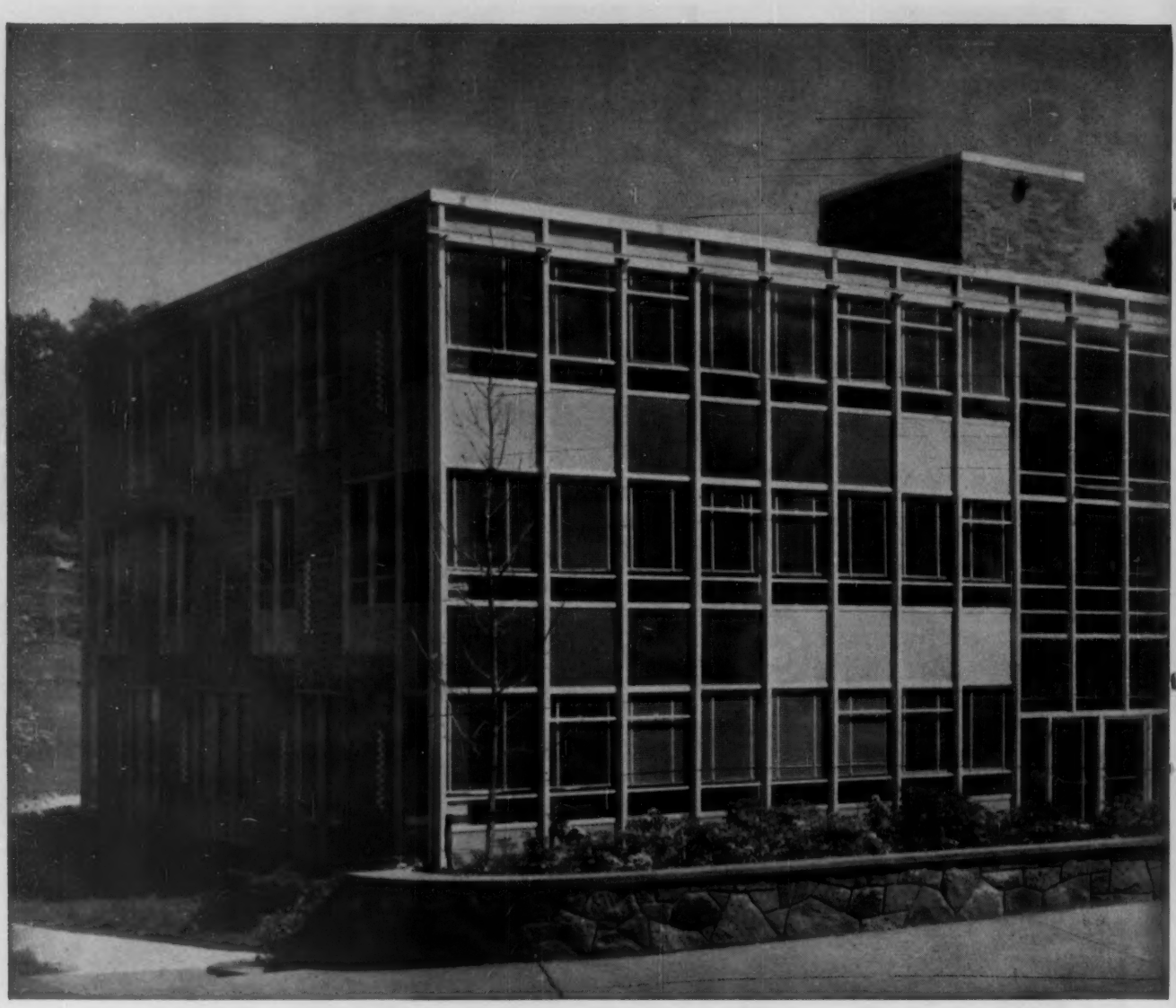
Pottstown Senior High School—Pottstown, Pennsylvania
Architects: Sanders & Thomas Associates—Pottstown, Pa.



Weber County High School—Ogden, Utah
Architects: Keith W. Wilcox and Associates—Ogden, Utah



Whitehall High School—Lehigh County, Pennsylvania
Architects: Wolf & Hahn—Allentown, Pennsylvania



LUPTON aluminum curtain walls create striking patterns in color at Yonkers' new Walt Whitman Junior High School

The bold, imaginative use of colors and patterns . . . in interiors and exteriors . . . is the most dramatic feature of ultra-modern, new, three-story Walt Whitman Junior High School, Yonkers, N.Y.

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The Walt Whitman Junior High School illustrates the exciting design possibilities for you inherent in LUPTON Aluminum Curtain Walls. A wide range of colors, windows in various styles, panels of metal or glass allow you unlimited creativity in design. This handsome modern wall construction provides striking visual effects when used alone or with brick, stone, and other materials.

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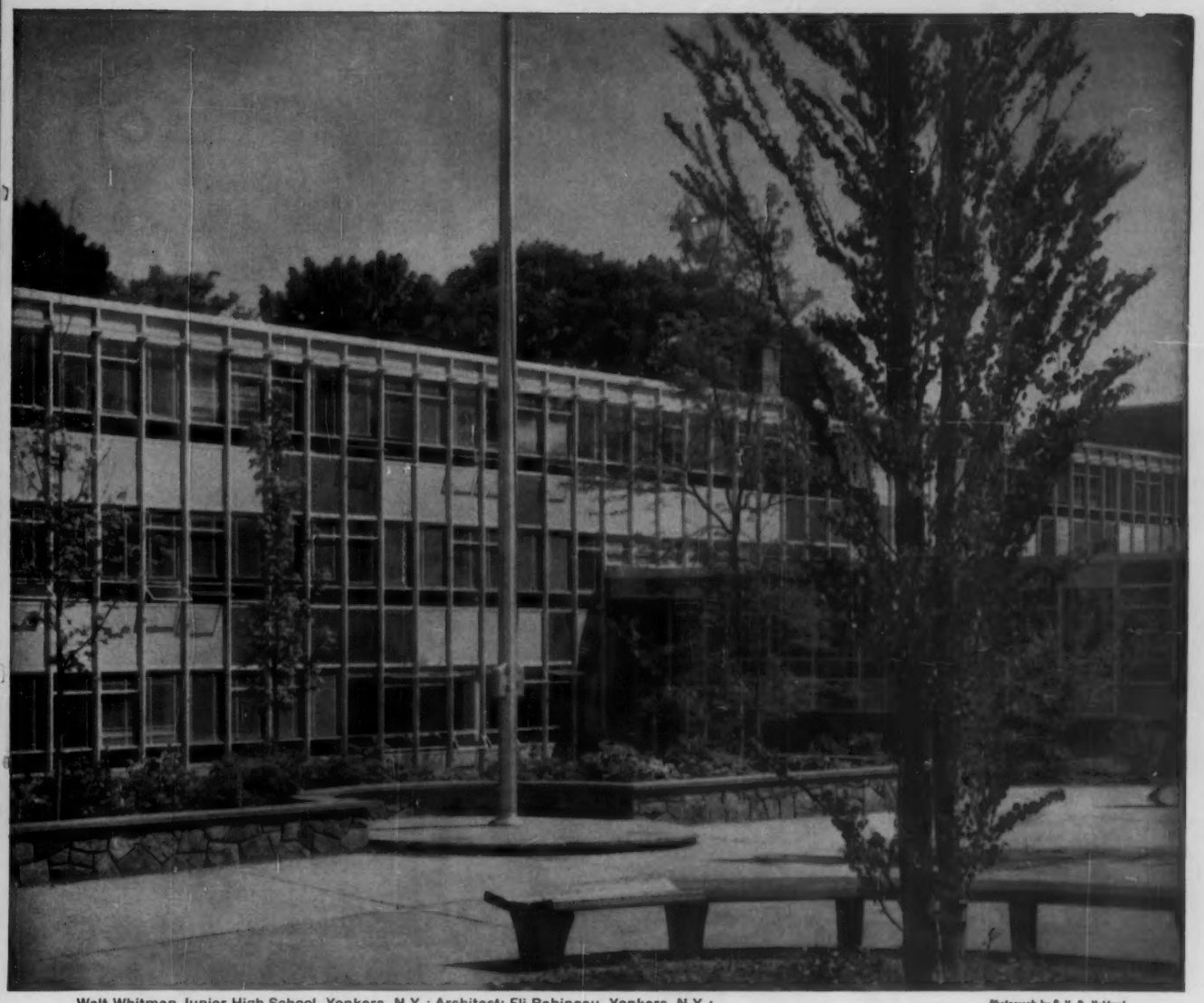
See the LUPTON Aluminum Curtain Wall and Window Catalog in Sweet's (sections 3 and 17).Then talk to your local LUPTON man or write to us for details.



Walt Whitman Junior High School, Yonkers, N.Y.; Architect: Eli Rabineau, Yonkers, N.Y.; Engineers: Abrams & Moses, New Rochelle, N.Y.

Photograph by C. V. D. Hubbard

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NOTICES

Name Changes

DAVIDSON AND MAURER, INCORPORATED, Architects and Engineers, 3142 Wilshire Blvd., Los Angeles, Calif. Formerly L. W. DAVIDSON & ASSOCIATES.

REED A. TROXEL, made Partner in firm of SNYDER & TROXEL, Consulting Engineers, 300 Denison Building, Syracuse, N.Y. Formerly STUART H. SNYDER, Consulting Engineer.

EUGENE L. STATON, made Partner in firm of MOTT, MOBLEY, HORSTMAN & STATON, Architects-Engineers 229 Merchants Bank Building, Fort Smith, Ark. Formerly MOTT, MOBLEY & HORSTMAN, Architects.

PHELPS H. BULTMAN, made Partner in firm of UPSHUR, RILEY AND BULTMAN, Architects-Engineers, 2740 Devine St., Columbia, S.C. Formerly UPSHUR AND RILEY, Architects and Engineers.

JOHN M. CLANCY, made Partner in firm of HAMILTON, GOODY & CLANCY, Architects, 238 Main St., Cambridge 42, Mass. Formerly HAMILTON & GOODY, Architects.

JAMES LONGWOOD, made Partner in firm of STAFFORD, MORIN & LONGWOOD, Architects, 2505 Capital Drive, Eugene, Ore. Formerly STAFFORD & MORIN, Architects.

ROBERT W. RATCLIFF, MURRAY A. SLAMA, BURNS CADWALADER, principals in firm of RATCLIFF-SLAMA-CADWALADER, Architects, 2286 Fulton St., Berkeley 4, Calif. Formerly RATCLIFF AND RATCLIFF, Architects.

WAASDORP, NORTHRUP AND KAELBER, Architects, 740 East Ave., Rochester 7, N.Y. ROGER O. AUSTIN will continue his association with the firm as an Architectural Consultant.

Corporation Name Change

FOOD MACHINERY AND CHEMICAL CORPORATION has changed its name to FMC CORPORATION, producers of industrial and agricultural machinery, basic chemicals, and defense material.

New MENGEL Company

CONTAINER CORPORATION has sold its plants and facilities in the wood products field to a group of former officials of the old MENGEL COMPANY of Louisville, Ky. A new company, MENGEL WOOD INDUSTRIES, INC., has been formed to operate these facilities.

New Design Company

DESIGNS FOR BUSINESS, INC. has formed a new company known as DESIGNS FOR HEALTH AND EDUCATION, INC., located at 609 Fifth Ave., New York City. It will specialize in the interior planning, design, furnishing, and equipping of hospitals, schools, universities, and institutions of all types.

Elections, Appointments

JORGEN HANSEN, appointed Design Coordinator of Architecture and Interiors in firm of CUSHING & NEVELL, Industrial Designers and Consultants, New York, N.Y.

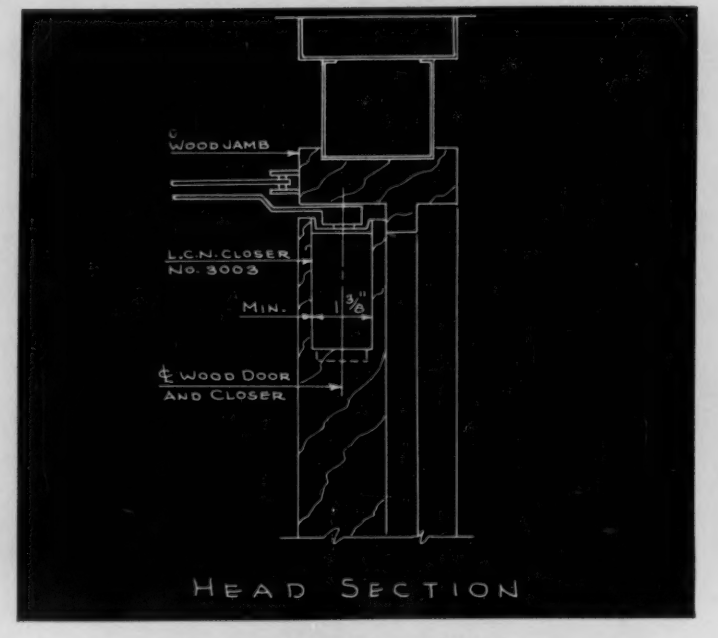
P/A Congratulates . . .

JOHN H. EIKENBERG, elected President and a member of the Executive Committee; WILLIAM T. BERTIER, elected Vice-President and General Manufacturing Manager; FRITZ C. HYDE, elected as a member of the Board of Directors, in firm of REVERE COPPER AND BRASS, INCORPORATED.

RAY J. MURPHY, named to the newly created position of Architectural Products Manager for the School Equipment Division in firm of BRUNSWICK CORPORATION.

WILLIAM S. POWELL, elected President and Chief Executive Officer in firm of HEXCEL PRODUCTS INC.

JAMES R. CHAMBERS of Lighting Products Division, Appleton Electric Co., has been made president of Illuminating Engineering Society.



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For LCN Closer Concealed-in-Door Shown on Opposite Page

The LCN Series 3002-3003 Closer's Main Points:

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2. Door is hung on butts; closer is easy to adjust
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5. Double arm provides high closing power
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For more information, turn to Reader Service card, circle No. 359

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Skidmore, Owings & Merrill,
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ARCHITECT—Engineering consulting firm in New York City seeks graduate Architect with solid experience in architectural design of major industrial facilities, preferably large central station steam electric power plants. Recent experience in direct charge of other architects required. Permanent position. Salary to $15,000 plus benefits. Send resume. Box # 301, PROGRESSIVE ARCHITECTURE.

ARCHITECT—Permanent position for graduate architect with good all-round background in architectural design and production of working plans. Position open immediately with established Midwest architects. Moving expenses paid. Send resume, including education, experience, and personal qualifications to Box 294, PROGRESSIVE ARCHITECTURE.

ARCHITECT—Permanent position for graduate architect with good all-around background in architectural design and production of working plans. Position open immediately with established Maritime architectural firm, moving expenses paid. Send resume, including education, experience, and personal qualifications to G. Keith Pickard, Registered Architect, Charlottetown, Prince Edward Island.

ARCHITECT—With 5 years experience, preferably registered, capable of being job captain, with design ability, for large architectural firm located in Pittsburgh, Pennsylvania area. Send resume, including education, experience, and personal qualifications to Box #295, PROGRESSIVE ARCHITECTURE.

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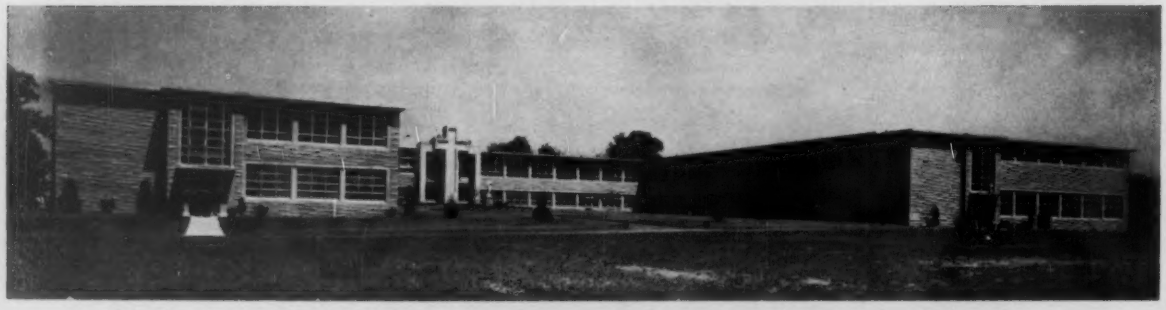

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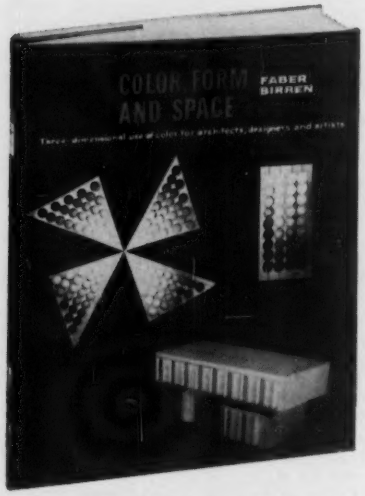

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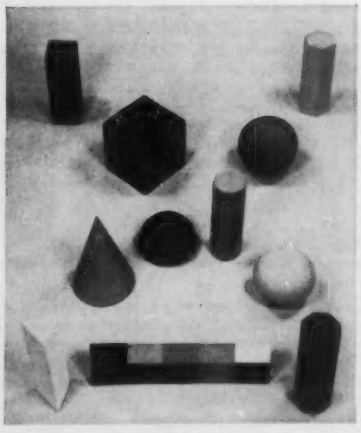

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Continued from page 226

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by MILDRED CONSTANTINE, *Associate Curator, Department of Architecture and Design, Museum of Modern Art,* and **EGBERT JACOBSON,** *President, Clearwater Art Seminar, Inc.*

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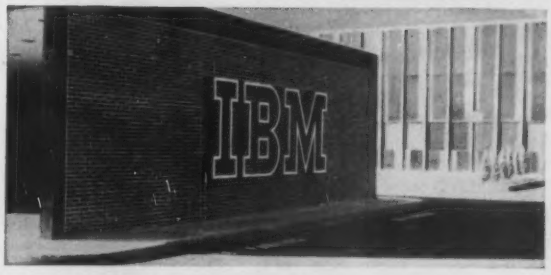

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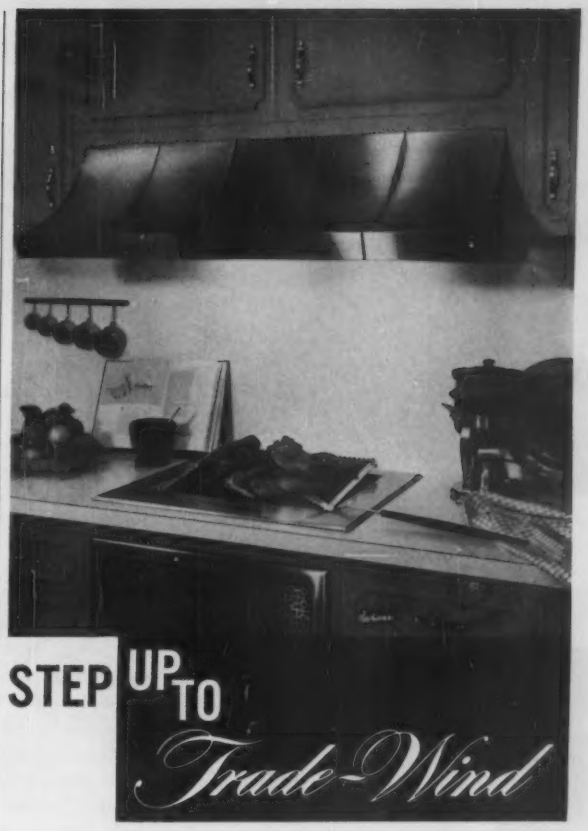

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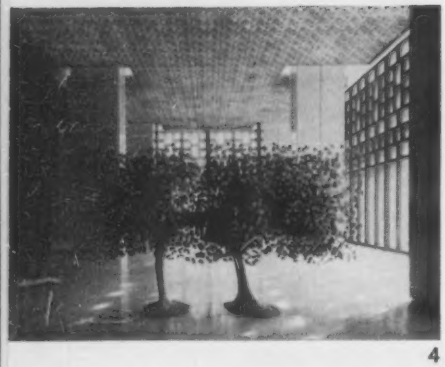

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The Relationship of Sculpture and Architecture is a subject that has concerned a number of critics in recent years, largely because sculpture in many of its manifestations seemed to be approaching architecture as a space-defining, if not space-enclosing medium; and architecture in many of its expressions seemed to be assuming sculptural forms. A review of a number of recent exhibitions, however, leads me to believe that this *rapprochement* is ending. For one thing, there is appearing a new baroque tendency in the related arts that is inconsistent with current architectural developments. For another, the sculptors who are staying with the abstract and abstract-expressionist approaches seem to be searching so hard for new tricks to distinguish themselves one from another that any architectonic, compositional relationship is being lost. And for a third thing, architecture appears, remarkably, to be settling into a more sedate, less exhibitionistic, less sculptural—even though more plastic—period. I think this will be evident when the results of our Design Awards judgment are published in our January issue.

The move to a figurative baroque approach was most clearly evident in a recent show to which the Whitney Museum of American Art gave its whole building last month: sculpture and "architecture" by Bernard Reder (see page 71, NEWS REPORT, SEPTEMBER 1961 P/A). The architecture, I thought, was embarrassing, despite Bucky Fuller's pat on the back. The sculpture, which had been shown at World House Galleries here in New York this past year and had gone almost unnoticed by the critics at that time, sometimes approaches Kafkaesque fantasy, but veers off into a Hansel-and-Gretel baroque. In an architectonic sense, it lacks form and unity; in a sculptural sense, it needs, at least, violent editing. I found acres of it around me extremely disturbing, as did several architects who saw it with me. The critics have gone overboard; Reder, in his sixty-fourth year, is the great new discovery, although he has been around to be seen for many years.

The high and the low points of the nuts-and-bolts school, the egg-crate school, and the battered-metal school were shown at their best, which is great good fun with little serious meaning, in a show called Assemblage, at The Museum of Modern Art; at its worst, in several group shows in individual galleries; and in an indiscriminate fashion, at an "international" show (which omitted much of the best work outside the United States) in the court at the New School for Social Research. Most of it has become very repetitious and tiresome by now, and the lack of true sculptural quality in most of the current work is opening the door wide to the neo-representationalists and the searchers for baroque fantasy.

In individual gallery shows recently, however, there has been some quite interesting work shown that architects could recognize as a kindred, related art. Noguchi, for instance, in a show at the Cordier-Warren Gallery, exhibited anodized aluminum pieces which were constructed with suave technical skill and conceived with great good taste and sense of form. In some instances the "form" is almost two-dimensional, for these are flat, thin designs, but there is always a bend or a cut or a twist which gives a subtle sense of the third dimension. Harry Bertoia has a piece on show at the Staempfli Gallery which—the coming baroque?—is solidly, architecturally composed of small rods gilded, but with an odd, almost cheap use of color at the tips. One of his latest installed architectural examples, in Pei's Denver Hilton, also loses its architectural dignity in two uncomfortable feet. At the Bertha Schaefer Gallery, one can see the work of Glen Michaels—extremely beautiful compositions in stones, tiles and many other objects fastened to boards in such a way as to compose three-dimensional, very live paintings. Abe Geller used Michaels for his pavement compositions in the FDR Memorial Competition to good effect.

I would guess that we are reaching a point where we should begin to evaluate sculpture as sculpture, and architecture as architecture, and try to relate the two simply by bringing good examples together. "Integration" of the arts, as though there could be a complete fusion as there was in the Middle Ages, seems to be a constantly more impossible ideal.

*1. **Bernard Reder: Minotaur and Siren.** Courtesy Whitney Museum of American Art. Photo: Charles Uht. 2. **Bruce Beasley: Tree House.** Courtesy The Museum of Modern Art; lent by Everett Ellin Gallery, Los Angeles. 3. **Isamu Noguchi: Noh Musicians.** Courtesy Daniel Cordier & Michel Warren, Inc. Photo: Rudolph Burkhardt. 4. **Harry Bertoia: Sculpture for Denver Hilton Hotel.** Courtesy Staempfli Gallery. Photo: George Cserna. 5. **Glen Michaels: Panel #5.** Courtesy Bertha Schaefer Gallery. Photo: Edward Meneeley.*

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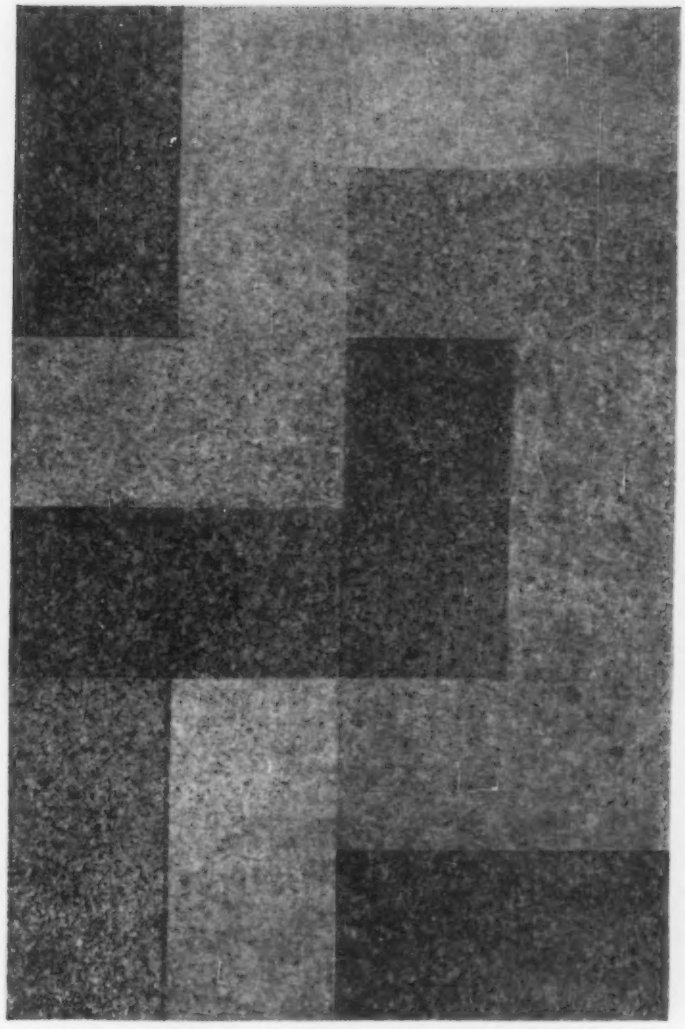

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